

	Test Report Serial No.:	100605AMW-F681-S80V	Report Issue Date:	Oct. 14, 2005
	Date(s) of Evaluation:	October 11-12, 2005	Report Rev. No.:	Revision 0
	Description of Tests:	RF Exposure   SAR	FCC §2.1093	IC RSS-102

**RF EXPOSURE EVALUATION**

**SPECIFIC ABSORPTION RATE**

**SAR TEST REPORT**

FOR THE

**UNIDEN AMERICA CORPORATION**

**PORTABLE VHF PTT MARINE RADIO TRANSCEIVER**

**MODEL: VHF150**

**FCC ID: AMWUT607**

**Test Report Serial Number**

**100605AMW-F681-S80V  
Revision 0**


**Test Report Issue Date**

**October 14, 2005**

**Test Lab**

**Celltech Compliance Testing & Engineering Lab  
(Celltech Labs Inc.)  
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<b>Applicant:</b>	Uniden America Corporation	<b>FCC ID:</b>	AMWUT607	<b>Model:</b>	VHF150	
<b>DUT Type:</b>	Portable VHF PTT Marine Radio Transceiver	<b>Freq. Range:</b>	156.025 - 157.425 MHz			
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## DECLARATION OF COMPLIANCE SAR RF EXPOSURE EVALUATION

<u>Test Lab</u>  <b>CELLTECH LABS INC.</b> Testing and Engineering Services 1955 Moss Court Kelowna, B.C. Canada V1Y 9L3 Phone: 250-448-7047 Fax: 250-448-7046 e-mail: info@celltechlabs.com web site: www.celltechlabs.com	<u>Applicant Information</u>  <b>UNIDEN AMERICA CORPORATION</b> 181 N. Country Club Road P.O. Box 580 Lake City, SC 29560 United States
<b>FCC IDENTIFIER:</b>	<b>AMWUT607</b>
<b>Model(s):</b>	<b>VHF150</b>
<b>Rule Part(s):</b>	<b>FCC 47 CFR §2.1093; IC RSS-102 Issue 1 (Provisional)</b>
<b>Test Procedure(s):</b>	<b>FCC OET Bulletin 65, Supplement C (Edition 01-01)</b>
<b>Device Classification:</b>	<b>Part 80 VHF Hand Held Transmitter (GMDSS) - GHH</b>
<b>Device Description:</b>	<b>Portable VHF PTT Marine Radio Transceiver</b>
<b>Modulation Type:</b>	<b>FM (VHF)</b>
<b>Tx Frequency Range:</b>	<b>156.025 - 157.425 MHz</b>
<b>Max. RF Output Power Measured:</b>	<b>37.58 dBm (5.73 Watts) Conducted (156.8 MHz)</b>
<b>Antenna Type(s) Tested:</b>	<b>Flexible Whip (P/N: ANT150)</b>
<b>Battery Type(s) Tested:</b>	<b>Li-ion Battery Pack 7.4 V, 1400 mAh (P/N: NTA2343)</b>
<b>Body-Worn Accessories Tested:</b>	<b>Plastic Swivel Belt-Clip with Metal Spring (P/N: CLIP250)</b>
<b>Audio Accessories Tested:</b>	<b>Speaker-Microphone (Model: HHVTA07)</b>
<b>Max. SAR Level(s) Evaluated:</b>	<b>Face-held: 0.681 W/kg (50% Duty Cycle) Body-worn: 0.538 W/kg (50% Duty Cycle)</b>

Celltech Labs Inc. declares under its sole responsibility that this wireless portable device has demonstrated compliance with the Specific Absorption Rate (SAR) RF exposure requirements specified in FCC 47 CFR §2.1093 and Health Canada's Safety Code 6. The device was tested in accordance with the measurement standards and procedures specified in FCC OET Bulletin 65, Supplement C (Edition 01-01) and Industry Canada RSS-102 Issue 1 (Provisional) for the General Population / Uncontrolled Exposure environment. All measurements were performed in accordance with the SAR system manufacturer recommendations.


I attest to the accuracy of data. All measurements were performed by me or were made under my supervision and are correct to the best of my knowledge and belief. I assume full responsibility for the completeness of these measurements and vouch for the qualifications of all persons taking them.

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<b>Tested By:</b>  <hr/> <b>Sean Johnston</b> Compliance Technologist Celltech Labs Inc.	<b>Reviewed By:</b>  <hr/> <b>Spencer Watson</b> Senior Compliance Technologist Celltech Labs Inc.
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## 1.0 INTRODUCTION

This measurement report demonstrates compliance of the Uniden America Corporation Model: VHF150 Portable VHF PTT Marine Radio Transceiver FCC ID: AMWUT607 with the SAR (Specific Absorption Rate) RF exposure requirements specified in FCC 47 CFR §2.1093 (see reference [1]), and Health Canada Safety Code 6 (see reference [2]) for the General Population / Uncontrolled Exposure environment. The test procedures described in FCC OET Bulletin 65, Supplement C (Edition 01-01) (see reference [3]) and IC RSS-102 Issue 1 (Provisional) (see reference [4]), were employed. A description of the product and operating configuration, detailed summary of the test results, methodology and procedures used in the evaluation, equipment used, and the various provisions of the rules are included within this test report.

## 2.0 DESCRIPTION OF DEVICE UNDER TEST (DUT)

<b>FCC Rule Part(s)</b>	47 CFR §2.1093			
<b>IC Rule Part(s)</b>	RSS-102 Issue 1 (Provisional)			
<b>Test Procedure(s)</b>	FCC OET Bulletin 65, Supplement C (Edition 01-01)			
<b>FCC Device Classification</b>	Part 80 VHF Hand Held Transmitter (GMDSS) - GHH			
<b>IC Device Classification</b>	RSS-182 - Maritime Radio Transmitter			
<b>Device Description</b>	Portable VHF PTT Marine Radio Transceiver			
<b>FCC IDENTIFIER</b>	AMWUT607			
<b>Model(s)</b>	VHF150			
<b>Test Sample Serial No.</b>	None		Identical Prototype	
<b>Modulation Type</b>	FM (VHF)			
<b>Tx Frequency Range</b>	156.025 - 157.425 MHz			
<b>Max. RF Output Power Measured</b>	37.58 dBm	5.73 Watts	156.8 MHz	Conducted
<b>Battery Type(s) Tested</b>	Lithium-ion	7.4 V	1400 mAh	P/N: BP250LI
<b>Additional Battery Type(s)</b> Testing Not Required	Alkaline Batteries		4x AAA	P/N: BT250 (Case)
	Note:	The alkaline battery pack was not evaluated for SAR due to the fact that maximum transmit power is limited to 2.5 Watts using alkaline batteries.		
<b>Antenna Type(s) Tested</b>	Detachable	Flexible Whip	Length: 120 mm	P/N: ANT150
<b>Body-Worn Accessories Tested</b>	Swivel Belt-Clip (Plastic with Metal Spring)			P/N: CLIP250
<b>Audio Accessories Tested</b>	Speaker-Microphone with Lapel-Clip			Model: HHVTA07

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### 3.0 SAR MEASUREMENT SYSTEM


Celltech Labs Inc. SAR measurement facility utilizes the Dosimetric Assessment System (DASY™) manufactured by Schmid & Partner Engineering AG (SPEAG™) of Zurich, Switzerland. The DASY4 measurement system is comprised of the measurement server, robot controller, computer, near-field probe, probe alignment sensor, specific anthropomorphic mannequin (SAM) phantom, and various planar phantoms for brain and/or body SAR evaluations. The robot is a six-axis industrial robot performing precise movements to position the probe to the location (points) of maximum electromagnetic field (EMF). A cell controller system contains the power supply, robot controller, teach pendant (Joystick), and remote control, is used to drive the robot motors. The Staubli robot is connected to the cell controller to allow software manipulation of the robot. A data acquisition electronic (DAE) circuit performs the signal amplification, signal multiplexing, AD-conversion, offset measurements, mechanical surface detection, collision detection, etc. is connected to the Electro-optical coupler (EOC). The EOC performs the conversion from the optical into digital electric signal of the DAE and transfers data to the DASY4 measurement server. The DAE3 utilizes a highly sensitive electrometer-grade preamplifier with auto-zeroing, a channel and gain-switching multiplexer, a fast 16-bit AD-converter and a command decoder and control logic unit. Transmission to the DASY4 measurement server is accomplished through an optical downlink for data and status information and an optical uplink for commands and clock lines. The mechanical probe-mounting device includes two different sensor systems for frontal and sidewise probe contacts. The sensor systems are also used for mechanical surface detection and probe collision detection. The robot uses its own controller with a built in VME-bus computer.




**DASY4 SAR Measurement System with validation phantom**



**DASY4 SAR Measurement System with Plexiglas planar phantom**

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## 4.0 MEASUREMENT SUMMARY


### SAR EVALUATION RESULTS

Test Type	Freq. (MHz)	Chan.	Test Mode	Battery Type	Antenna Type	Accessories		Separation Distance to Planar Phantom (cm)	Cond. Power Before Test (dBm)	Measured SAR 1g (W/kg)		SAR Drift During Test (dB)	Scaled SAR with droop 1g (W/kg)		
						Body-worn	Audio			Duty Cycle			Duty Cycle		
										100%	50%		100%	50%	
Face	156.8	16	CW	Li-Ion	Whip	-	-	2.5	37.52	1.06	0.530	-1.09	1.36	<b>0.681</b>	
Body	156.8	16	CW	Li-Ion	Whip	Belt-Clip	Speaker Microphone	2.2	37.58	0.959	0.480	-0.497	1.08	<b>0.538</b>	
<b>ANSI / IEEE C95.1 1999 - SAFETY LIMIT</b>					<b>BRAIN / BODY: 1.6 W/kg (averaged over 1 gram)</b>				<b>Spatial Peak Uncontrolled Exposure / General Population</b>						
<b>Test Date</b>	October 11, 2005				October 12, 2005				<b>Measured Fluid Type</b>	<b>Brain</b>	<b>Body</b>	<b>Unit</b>			
<b>Dielectric Constant <math>\epsilon_r</math></b>	<b>150 MHz Brain</b>				<b>150 MHz Body</b>				<b>Atmospheric Pressure</b>	102.2	102.0	<b>kPa</b>			
	<b>IEEE Target</b>	<b>Meas.</b>	<b>Dev.</b>	<b>IEEE Target</b>	<b>Meas.</b>	<b>Dev.</b>	<b>Relative Humidity</b>	31	31	<b>%</b>					
	<b>52.3</b>	<b>± 5%</b>	53.1	+1.5%	<b>61.9</b>	<b>± 5%</b>	61.3	-1.0%	<b>Ambient Temperature</b>	23.1	23.5	<b>°C</b>			
<b>Conductivity <math>\sigma</math> (mho/m)</b>	<b>150 MHz Brain</b>				<b>150 MHz Body</b>				<b>Fluid Temperature</b>	22.4	22.6	<b>°C</b>			
	<b>IEEE Target</b>	<b>Meas.</b>	<b>Dev.</b>	<b>IEEE Target</b>	<b>Meas.</b>	<b>Dev.</b>	<b>Fluid Depth</b>	≥ 15	≥ 15	<b>cm</b>					
	<b>0.76</b>	<b>± 5%</b>	0.77	+1.3%	<b>0.80</b>	<b>± 5%</b>	0.77	-3.8%	<b><math>\rho</math> (Kg/m<sup>3</sup>)</b>	1000					

Note(s):

- The measurement results were obtained with the DUT tested in the conditions described in this report. Detailed measurement data and plots showing the maximum SAR location of the DUT are reported in Appendix A.
- The transmission band of the DUT was < 10 MHz; therefore only the middle channel of the frequency band was evaluated (per FCC OET Bulletin 65, Supplement C, Edition 01-01 - see reference [3]).
- The power droops measured by the DASY4 system for the duration of the SAR evaluations were added to the measured SAR levels to report scaled SAR results as shown in the above test data table.
- A SAR-versus-Time power drift evaluation was performed in the test configuration that reported the maximum scaled SAR (Face-held). See Appendix A (SAR Test Plots) for SAR-versus-Time power droop evaluation plot.
- The ambient and fluid temperatures were measured prior to, and during, the fluid dielectric parameter check and the SAR evaluations. The temperatures reported were consistent for all measurement periods.
- The dielectric parameters of the simulated tissue mixtures were measured prior to the SAR evaluations using an ALS-PR-DIEL Dielectric Probe Kit and an HP 8753ET Network Analyzer (see Appendix C for measured fluid dielectric parameters).
- The SAR evaluations were performed within 24 hours of the system performance check.

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<b>DUT Type:</b>	<b>Portable VHF PTT Marine Radio Transceiver</b>	<b>Freq. Range:</b>	<b>156.025 - 157.425 MHz</b>			
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## 5.0 DETAILS OF SAR EVALUATION

The Uniden America Corporation Model: VHF150 Portable VHF PTT Marine Radio Transceiver FCC ID: AMWUT607 was compliant for localized Specific Absorption Rate (General Population / Uncontrolled Exposure) based on the test provisions and conditions described below. The detailed test setup photographs are shown in Appendix D.

- The DUT was evaluated in a face-held configuration with the front of the radio placed parallel to the outer surface of the planar phantom. A 2.5 cm separation distance was maintained between the front side of the DUT and the outer surface of the planar phantom.
- The DUT was tested in a body-worn configuration with the back of the radio placed parallel to the outer surface of the planar phantom. The attached swivel belt-clip accessory was touching the planar phantom and provided a 2.2 cm separation distance from the back of the DUT to the outer surface of the planar phantom. The DUT was evaluated for body-worn SAR with the speaker-microphone audio accessory.
- The conducted power levels were measured prior to each test using a Gigatronics 8652A Universal Power Meter according to the procedures described in FCC 47 CFR §2.1046.
- The power droops measured by the DASY4 system during the SAR evaluations were added to the measured SAR levels to report scaled SAR results as shown in the test data table (page 6).
- A SAR-versus-Time power drift evaluation was performed in the test configuration that reported the maximum scaled SAR level. See Appendix A (SAR Test Plots) for SAR-versus-Time power drift evaluation plot.
- The area scan evaluation was performed with a fully charged battery. After the area scan was completed the radio was cooled down to room temperature and the battery was replaced with a fully charged battery prior to the zoom scan evaluation.
- The DUT was tested in unmodulated continuous transmit operation (Continuous Wave mode at 100% duty cycle) with the transmit key constantly depressed. For a push-to-talk device the 50% duty cycle compensation reported assumes a transmit/receive cycle of equal time base.
- The SAR evaluations were performed using a Plexiglas planar phantom.
- The SAR evaluations were performed within 24 hours of the system performance check.

## 6.0 EVALUATION PROCEDURES


- (i) The evaluation was performed in the applicable area of the phantom depending on the type of device being tested. For devices held to the ear during normal operation, both the left and right ear positions were evaluated using the SAM phantom.
- (ii) For body-worn and face-held devices a planar phantom was used.
- The SAR was determined by a pre-defined procedure within the DASY4 software. Upon completion of a reference and optical surface check, the exposed region of the phantom was scanned near the inner surface with a grid spacing of 15mm x 15mm.

An area scan was determined as follows:

- Based on the defined area scan grid, a more detailed grid is created to increase the points by a factor of 10. The interpolation function then evaluates all field values between corresponding measurement points.
- A linear search is applied to find all the candidate maxima. Subsequently, all maxima are removed that are >2 dB from the global maximum. The remaining maxima are then used to position the cube scans.

A 1g and 10g spatial peak SAR was determined as follows:

- Extrapolation is used to find the points between the dipole center of the probe and the surface of the phantom. This data cannot be measured, since the center of the dipoles is 2.7 mm away from the tip of the probe and the distance between the surface and the lowest measuring point is 1.4 mm (see probe calibration document in Appendix F). The extrapolation was based on trivariate quadratics computed from the previously calculated 3D interpolated points nearest the phantom surface.
- Interpolated data is used to calculate the average SAR over 1g and 10g cubes by spatially discretizing the entire measured cube. The volume used to determine the averaged SAR is a 1mm grid (42875 interpolated points).
- A zoom scan volume of 32 mm x 32 mm x 30 mm (5 x 5 x 7 points) centered at the peak SAR location determined from the area scan is used for all zoom scans for devices with a transmit frequency < 800 MHz. Zoom scans for frequencies ≥ 800 MHz are determined with a scan volume of 30 mm x 30 mm x 30 mm (7 x 7 x 7) to ensure complete capture of the peak spatial-average SAR.

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## 7.0 SYSTEM PERFORMANCE CHECK

Prior to the SAR evaluation a system check was performed using a planar phantom with a 300 MHz dipole (see Appendix E for system validation procedures). The dielectric parameters of the simulated tissue mixture were measured prior to the system performance check using an ALS-PR-DIEL Dielectric Probe Kit and an HP 8753ET Network Analyzer (see Appendix C for measured fluid dielectric parameters). A forward power of 250 mW was applied to the dipole and the system was verified to a tolerance of  $\pm 10\%$  (see Appendix B for system performance check test plot).

SYSTEM PERFORMANCE CHECK EVALUATION																
Test Date	300MHz Equiv. Tissue	SAR 1g (W/kg)			Dielectric Constant $\epsilon_r$			Conductivity $\sigma$ (mho/m)			$\rho$ (Kg/m <sup>3</sup> )	Amb. Temp. (°C)	Fluid Temp. (°C)	Fluid Depth (cm)	Humid. (%)	Barom. Press. (kPa)
		IEEE Target	Meas.	Dev.	IEEE Target	Meas.	Dev.	IEEE Target	Meas.	Dev.						
10/11/05	Brain	0.750 $\pm 10\%$	0.756	+0.8%	45.3 $\pm 5\%$	44.5	-1.8%	0.87 $\pm 5\%$	0.84	-3.4%	1000	22.6	22.6	$\geq 15$	32	102.3

Note(s):  
 1. The ambient and fluid temperatures were measured prior to, and during, the fluid dielectric parameter check and the system performance check. The temperatures listed in the table above were consistent for all measurement periods.

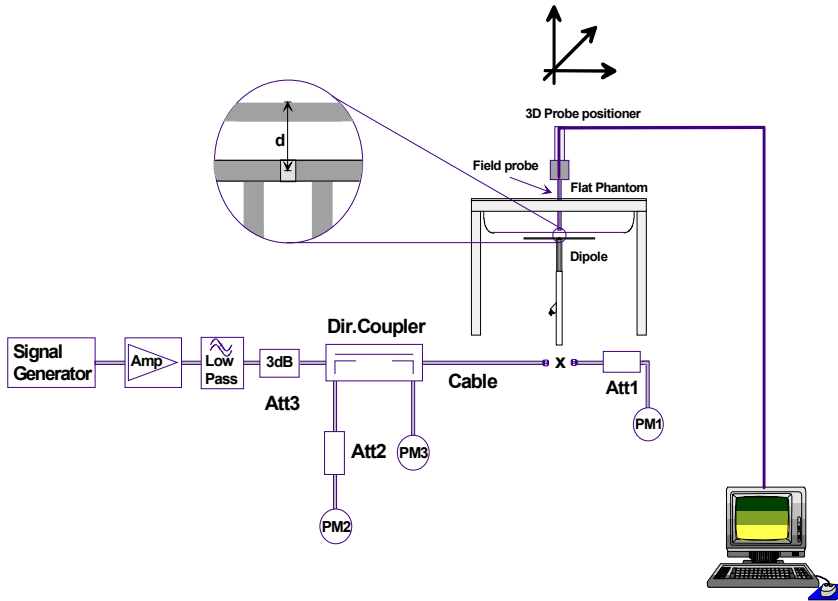



Figure 1. System Performance Check Setup Diagram



300MHz Dipole Setup



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## 8.0 SIMULATED EQUIVALENT TISSUES

The simulated tissue mixtures consist of a viscous gel using hydroxyethylcellulose (HEC) gelling agent and saline solution. Preservation with a bactericide is added and visual inspection is made to ensure air bubbles are not trapped during the mixing process. The fluid was prepared according to standardized procedures and measured for dielectric parameters (permittivity and conductivity).


SIMULATED TISSUE MIXTURES			
INGREDIENT	300 MHz Brain (%)	150 MHz Brain (%)	150 MHz Body (%)
	System Performance Check	DUT Evaluation	DUT Evaluation
Water	37.56	38.35	46.6
Sugar	55.32	55.5	49.7
Salt	5.95	5.15	2.6
HEC	0.98	0.9	1.0
Bactericide	0.19	0.1	0.1


## 9.0 SAR SAFETY LIMITS

EXPOSURE LIMITS	SAR (W/kg)	
	(General Population / Uncontrolled Exposure Environment)	(Occupational / Controlled Exposure Environment)
Spatial Average (averaged over the whole body)	0.08	0.4
Spatial Peak (averaged over any 1g of tissue)	1.60	8.0
Spatial Peak (hands/wrists/feet/ankles averaged over 10g)	4.0	20.0

Notes:

1. Uncontrolled environments are defined as locations where there is potential exposure of individuals who have no knowledge or control of their potential exposure.
2. Controlled environments are defined as locations where there is potential exposure of individuals who have knowledge of their potential exposure and can exercise control over their exposure.

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## 10.0 ROBOT SYSTEM SPECIFICATIONS

### Specifications

**POSITIONER:**                    Stäubli Unimation Corp. Robot Model: RX60L  
**Repeatability:**                0.02 mm  
**No. of axis:**                    6

### Data Acquisition Electronic (DAE) System

#### Cell Controller

**Processor:**                    AMD Athlon XP 2400+  
**Clock Speed:**                2.0 GHz  
**Operating System:**        Windows XP Professional

#### Data Converter

**Features:**                    Signal Amplifier, multiplexer, A/D converter, and control logic  
**Software:**                    DASY4 software  
**Connecting Lines:**        Optical downlink for data and status info.  
    Optical uplink for commands and clock

### DASY4 Measurement Server

**Function:**                    Real-time data evaluation for field measurements and surface detection  
**Hardware:**                    PC/104 166MHz Pentium CPU; 32 MB chipdisk; 64 MB RAM  
**Connections:**                COM1, COM2, DAE, Robot, Ethernet, Service Interface

### E-Field Probe

**Model:**                        ET3DV6  
**Serial No.:**                    1387  
**Construction:**                Triangular core fiber optic detection system  
**Frequency:**                    10 MHz to 6 GHz  
**Linearity:**                    ±0.2 dB (30 MHz to 3 GHz)


### Phantom(s)

#### Evaluation Phantom

**Type:**                         Planar Phantom  
**Shell Material:**              Plexiglas  
**Bottom Thickness:**        2.0 mm ± 0.1 mm  
**Outer Dimensions:**        75.0 cm (L) x 22.5 cm (W) x 20.5 cm (H); Back Plane: 25.7 cm (H)

#### Validation Phantom (≤ 450MHz)

**Type:**                         Planar Phantom  
**Shell Material:**              Plexiglas  
**Bottom Thickness:**        6.2 mm ± 0.1 mm  
**Outer Dimensions:**        86.0 cm (L) x 39.5 cm (W) x 21.8 cm (H)

<b>Applicant:</b>	Uniden America Corporation	<b>FCC ID:</b>	AMWUT607	<b>Model:</b>	VHF150	
<b>DUT type:</b>	Portable VHF PTT Marine Radio Transceiver	<b>Freq. Range:</b>	156.025 - 157.425 MHz			
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## 11.0 PROBE SPECIFICATION (ET3DV6)

**Construction:** Symmetrical design with triangular core  
 Built-in shielding against static charges  
 PEEK enclosure material (resistant to organic solvents, e.g. glycol)

**Calibration:** In air from 10 MHz to 2.5 GHz  
 In brain simulating tissue at frequencies of 900 MHz and 1.8 GHz (accuracy  $\pm 8\%$ )

**Frequency:** 10 MHz to > 6 GHz; Linearity:  $\pm 0.2$  dB (30 MHz to 3 GHz)

**Directivity:**  $\pm 0.2$  dB in brain tissue (rotation around probe axis)  
 $\pm 0.4$  dB in brain tissue (rotation normal to probe axis)

**Dynamic Range:** 5  $\mu$ W/g to > 100 mW/g; Linearity:  $\pm 0.2$  dB

**Surface Detection:**  $\pm 0.2$  mm repeatability in air and clear liquids over diffuse reflecting surfaces

**Dimensions:** Overall length: 330 mm  
 Tip length: 16 mm  
 Body diameter: 12 mm  
 Tip diameter: 6.8 mm  
 Distance from probe tip to dipole centers: 2.7 mm

**Application:** General dosimetry up to 3 GHz  
 Compliance tests of mobile phone



**ET3DV6 E-Field Probe**

## 12.0 PLANAR PHANTOM

The planar phantom is constructed of Plexiglas material with a 2.0 mm shell thickness for face-held and body-worn SAR evaluations of handheld and body-worn radio transceivers. The planar phantom is mounted on the side of the DASY4 compact system table.



**Plexiglas Planar Phantom**

## 13.0 VALIDATION PLANAR PHANTOM

The validation planar phantom is constructed of Plexiglas material with a 6.0 mm shell thickness for system validations at 450MHz and below. The validation planar phantom is mounted in the table of the DASY4 compact system.




**Validation Planar Phantom**

## 14.0 DEVICE HOLDER

The DASY4 device holder has two scales for device rotation (with respect to the body axis) and the device inclination (with respect to the line between the ear openings). The plane between the ear openings and the mouth tip has a rotation angle of 65°. The bottom plate contains three pair of bolts for locking the device holder. The device holder positions are adjusted to the standard measurement positions in the three sections.





**Device Holder**

	Test Report Serial No.:	100605AMW-F681-S80V	Report Issue Date:	Oct. 14, 2005
	Date(s) of Evaluation:	October 11-12, 2005	Report Rev. No.:	Revision 0
	Description of Tests:	RF Exposure   SAR	FCC §2.1093	IC RSS-102

## 15.0 TEST EQUIPMENT LIST

USED	TEST EQUIPMENT DESCRIPTION	ASSET NO.	SERIAL NO.	DATE CALIBRATED	CALIBRATION DUE DATE	
x	Schmid & Partner DASY4 System	-	-	-	-	
x	-DASY4 Measurement Server	00158	1078	N/A	N/A	
x	-Robot	00046	599396-01	N/A	N/A	
x	-DAE4	00019	353	15Jun05	15Jun06	
	-DAE3	00018	370	25Jan05	25Jan06	
x	-ET3DV6 E-Field Probe	00016	1387	18Mar05	18Mar06	
	-ET3DV6 E-Field Probe	00017	1590	20May05	20May06	
	-EX3DV4 E-Field Probe	00125	3547	21Jan05	21Jan06	
x	-300MHz Validation Dipole	00023	135	26Oct04	26Oct05	
	-450MHz Validation Dipole	00024	136	04Nov04	04Nov05	
	-835MHz Validation Dipole	00022	411	Brain	30Mar05	30Mar06
				Body	12Apr05	12Apr06
	-900MHz Validation Dipole	00020	054	Brain	10Jun05	10Jun06
				Body	10Jun05	10Jun06
	-1800MHz Validation Dipole	00021	247	Brain	14Jun05	14Jun06
				Body	14Jun05	14Jun06
	-1900MHz Validation Dipole	00032	151	Brain	17Jun05	17Jun06
				Body	22Apr05	22Apr06
	-2450MHz Validation Dipole	00025	150	Brain	20Sep05	20Sep06
				Body	22Apr05	22Apr06
	-5000MHz Validation Dipole	00126	1031	Brain	11Jan05	11Jan06
				Body	11Jan05	11Jan06
	-SAM Phantom V4.0C	00154	1033	N/A	N/A	
	-Barski Planar Phantom	00155	03-01	N/A	N/A	
x	-Plexiglas Planar Phantom	00156	161	N/A	N/A	
x	-Validation Planar Phantom	00157	137	N/A	N/A	
	HP 85070C Dielectric Probe Kit	00033	N/A	N/A	N/A	
x	ALS-PR-DIEL Dielectric Probe Kit	00160	260-00953	N/A	N/A	
x	Gigatronics 8652A Power Meter	00110	1835801	16Apr05	16Apr06	
	Gigatronics 8652A Power Meter	00008	1835267	29Apr05	29Apr06	
	Gigatronics 8652A Power Meter	00007	1835272	18Oct04	18Oct05	
	Gigatronics 80701A Power Sensor	00012	1834350	12Sep05	12Sep06	
x	Gigatronics 80701A Power Sensor	00014	1833699	07Sep05	07Sep06	
x	Gigatronics 80701A Power Sensor	00109	1834366	16Apr05	16Apr06	
x	HP 8753ET Network Analyzer	00134	US39170292	04May05	04May06	
x	HP 8648D Signal Generator	00005	3847A00611	29Apr05	29Apr06	
	Rohde & Schwarz SMR40 Signal Generator	00006	100104	12Apr05	12Apr06	
x	Amplifier Research 5S1G4 Power Amplifier	00106	26235	N/A	N/A	


<b>Applicant:</b>	<b>Uniden America Corporation</b>	<b>FCC ID:</b>	<b>AMWUT607</b>	<b>Model:</b>	<b>VHF150</b>	
<b>DUT Type:</b>	<b>Portable VHF PTT Marine Radio Transceiver</b>	<b>Freq. Range:</b>	<b>156.025 - 157.425 MHz</b>			
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## 16.0 MEASUREMENT UNCERTAINTIES

UNCERTAINTY BUDGET FOR DEVICE EVALUATION						
Error Description	Uncertainty Value $\pm\%$	Probability Distribution	Divisor	ci 1g	Uncertainty Value $\pm\%$ (1g)	$V_i$ or $V_{eff}$
<b>Measurement System</b>						
Probe calibration	5.0	Normal	1	1	5.0	$\infty$
Axial isotropy of the probe	4.7	Rectangular	1.732050808	0.7	1.9	$\infty$
Spherical isotropy of the probe	9.6	Rectangular	1.732050808	0.7	3.9	$\infty$
Spatial resolution	0	Rectangular	1.732050808	1	0.0	$\infty$
Boundary effects	1	Rectangular	1.732050808	1	0.6	$\infty$
Probe linearity	4.7	Rectangular	1.732050808	1	2.7	$\infty$
Detection limit	1	Rectangular	1.732050808	1	0.6	$\infty$
Readout electronics	0.3	Normal	1	1	0.3	$\infty$
Response time	0.8	Rectangular	1.732050808	1	0.5	$\infty$
Integration time	2.6	Rectangular	1.732050808	1	1.5	$\infty$
RF ambient conditions	3	Rectangular	1.732050808	1	1.7	$\infty$
Mech. constraints of robot	0.4	Rectangular	1.732050808	1	0.2	$\infty$
Probe positioning	2.9	Rectangular	1.732050808	1	1.7	$\infty$
Extrapolation & integration	1	Rectangular	1.732050808	1	0.6	$\infty$
<b>Test Sample Related</b>						
Device positioning	2.9	Normal	1	1	2.9	12
Device holder uncertainty	3.6	Normal	1	1	3.6	8
Power drift	5	Rectangular	1.732050808	1	2.9	$\infty$
<b>Phantom and Setup</b>						
Phantom uncertainty	4	Rectangular	1.732050808	1	2.3	$\infty$
Liquid conductivity (target)	5	Rectangular	1.732050808	0.64	1.8	$\infty$
Liquid conductivity (measured)	2.5	Normal	1	0.64	1.6	$\infty$
Liquid permittivity (target)	5	Rectangular	1.732050808	0.6	1.7	$\infty$
Liquid permittivity (measured)	2.5	Normal	1	0.6	1.5	$\infty$
<b>Combined Standard Uncertainty</b>					<b>10.33</b>	
<b>Expanded Uncertainty (k=2)</b>					<b>20.66</b>	

Measurement Uncertainty Table in accordance with IEEE Standard 1528-2003 (see reference [5])


<b>Applicant:</b>	Uniden America Corporation	<b>FCC ID:</b>	AMWUT607	<b>Model:</b>	VHF150	
<b>DUT Type:</b>	Portable VHF PTT Marine Radio Transceiver	<b>Freq. Range:</b>	156.025 - 157.425 MHz			
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## MEASUREMENT UNCERTAINTIES (CONT.)

UNCERTAINTY BUDGET FOR SYSTEM VALIDATION						
Error Description	Uncertainty Value ±%	Probability Distribution	Divisor	ci 1g	Uncertainty Value ±% (1g)	V <sub>i</sub> or V <sub>eff</sub>
<b>Measurement System</b>						
Probe calibration	4.5	Normal	1	1	4.5	∞
Axial isotropy of the probe	4.7	Rectangular	1.732050808	1	2.7	∞
Spherical isotropy of the probe	0	Rectangular	1.732050808	1	0.0	∞
Spatial resolution	0	Rectangular	1.732050808	1	0.0	∞
Boundary effects	1	Rectangular	1.732050808	1	0.6	∞
Probe linearity	4.7	Rectangular	1.732050808	1	2.7	∞
Detection limit	1	Rectangular	1.732050808	1	0.6	∞
Readout electronics	0.3	Normal	1	1	0.3	∞
Response time	0	Rectangular	1.732050808	1	0.0	∞
Integration time	0	Rectangular	1.732050808	1	0.0	∞
RF ambient conditions	3	Rectangular	1.732050808	1	1.7	∞
Mech. constraints of robot	0.4	Rectangular	1.732050808	1	0.2	∞
Probe positioning	2.9	Rectangular	1.732050808	1	1.7	∞
Extrapolation & integration	1	Rectangular	1.732050808	1	0.6	∞
<b>Test Sample Related</b>						
Dipole Positioning	2	Normal	1.732050808	1	1.2	∞
Power & Power Drift	4.7	Normal	1.732050808	1	2.7	∞
<b>Phantom and Setup</b>						
Phantom uncertainty	4	Rectangular	1.732050808	1	2.3	∞
Liquid conductivity (target)	5	Rectangular	1.732050808	0.64	1.8	∞
Liquid conductivity (measured)	2.5	Normal	1	0.64	1.6	∞
Liquid permittivity (target)	5	Rectangular	1.732050808	0.6	1.7	∞
Liquid permittivity (measured)	2.5	Normal	1	0.6	1.5	∞
<b>Combined Standard Uncertainty</b>					<b>8.20</b>	
<b>Expanded Uncertainty (k=2)</b>					<b>16.39</b>	


Measurement Uncertainty Table in accordance with IEEE Standard 1528-2003 (see reference [5])

<b>Applicant:</b>	Uniden America Corporation	<b>FCC ID:</b>	AMWUT607	<b>Model:</b>	VHF150	
<b>DUT Type:</b>	Portable VHF PTT Marine Radio Transceiver	<b>Freq. Range:</b>	156.025 - 157.425 MHz			
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	Date(s) of Evaluation:	October 11-12, 2005	Report Rev. No.:	Revision 0
	Description of Tests:	RF Exposure	SAR	FCC §2.1093


## 17.0 REFERENCES

- [1] Federal Communications Commission, "Radiofrequency radiation exposure evaluation: portable devices", Rule Part 47 CFR §2.1093: 1999.
- [2] Health Canada, "Limits of Human Exposure to Radiofrequency Electromagnetic Fields in the Frequency Range from 3 kHz to 300 GHz", Safety Code 6: 1999.
- [3] Federal Communications Commission, "Evaluating Compliance with FCC Guidelines for Human Exposure to Radio frequency Electromagnetic Fields", OET Bulletin 65, Supplement C (Edition 01-01), FCC, Washington, D.C.: June 2001.
- [4] Industry Canada, "Evaluation Procedure for Mobile and Portable Radio Transmitters with respect to Health Canada's Safety Code 6 for Exposure of Humans to Radio Frequency Fields", Radio Standards Specification RSS-102 Issue 1 (Provisional): September 1999.
- [5] IEEE Std 1528-2003, "Recommended Practice for Determining the Peak Spatial-Average Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques": December 2003.


<b>Applicant:</b>	<b>Uniden America Corporation</b>	<b>FCC ID:</b>	<b>AMWUT607</b>	<b>Model:</b>	<b>VHF150</b>	
<b>DUT Type:</b>	<b>Portable VHF PTT Marine Radio Transceiver</b>	<b>Freq. Range:</b>	<b>156.025 - 157.425 MHz</b>			
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**APPENDIX A - SAR MEASUREMENT DATA**

<b>Applicant:</b>	Uniden America Corporation	<b>FCC ID:</b>	AMWUT607	<b>Model:</b>	VHF150	
<b>DUT Type:</b>	Portable VHF PTT Marine Radio Transceiver	<b>Freq. Range:</b>	156.025 - 157.425 MHz			
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	Description of Tests:	RF Exposure	SAR	FCC §2.1093

Date Tested: 10/11/2005

## Face-Held SAR

**DUT: Uniden Model: VHF150; Type: Portable VHF PTT Marine Radio Transceiver; Serial: None (Pre-Production)**

Ambient Temp: 23.1 °C; Fluid Temp: 22.4 °C; Barometric Pressure: 102.2 kPa; Humidity: 31%

Communication System: FM VHF

RF Output Power: 37.52 dBm (Conducted)

7.4V, 1400mAh Li-ion Battery Pack (P/N: BP250LI)

Frequency: 156.8 MHz; Channel 16; Duty Cycle: 1:1

Medium: HSL150 ( $\sigma = 0.77$  mho/m;  $\epsilon_r = 53.1$ ;  $\rho = 1000$  kg/m<sup>3</sup>)

- Probe: ET3DV6 - SN1387; ConvF(8.8, 8.8, 8.8); Calibrated: 18/03/2005
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn353; Calibrated: 15/06/2005
- Phantom: Planar; Type: Plexiglas; Serial: 161
- Measurement SW: DASY4, V4.6 Build 19; Postprocessing SW: SEMCAD, V1.8 Build 159

**Face-Held SAR - 2.5 cm Separation Distance to Planar Phantom - Mid Channel/Area Scan (8x18x1):**

Measurement grid: dx=15mm, dy=15mm

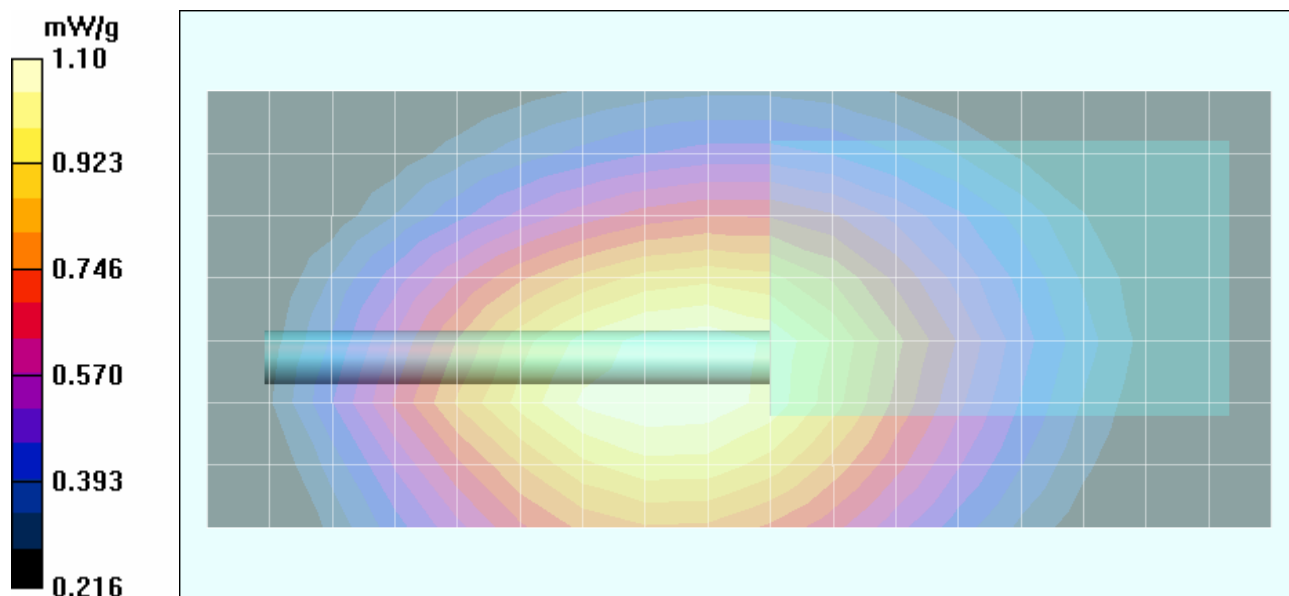
**Face-Held SAR - 2.5 cm Separation Distance to Planar Phantom - Mid Channel/Zoom Scan (5x5x7)/Cube 0:**


Measurement grid: dx=7.5mm, dy=7.5mm, dz=5mm

Reference Value = 38.2 V/m; Power Drift = -1.09 dB

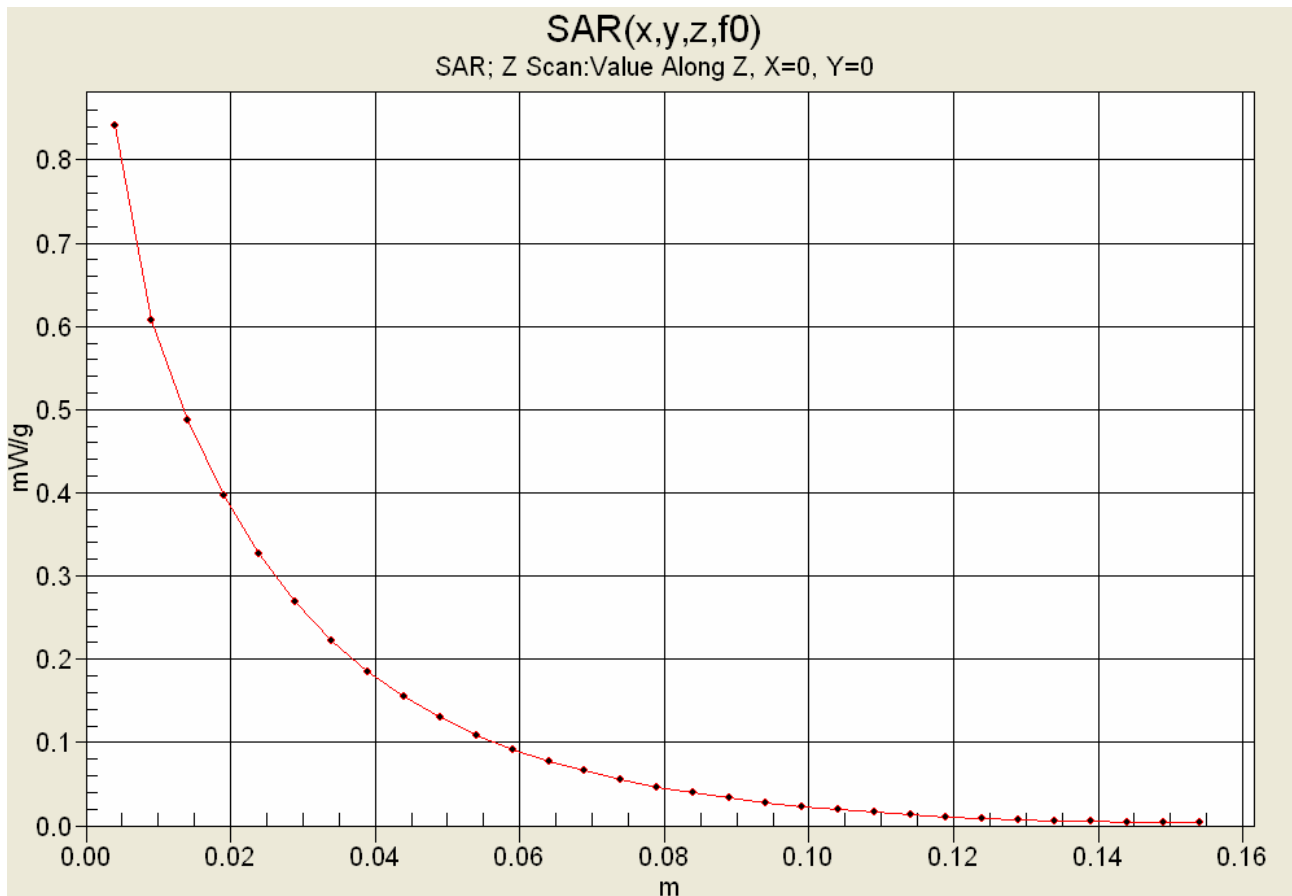
Peak SAR (extrapolated) = 1.62 W/kg

**SAR(1 g) = 1.06 mW/g; SAR(10 g) = 0.784 mW/g**



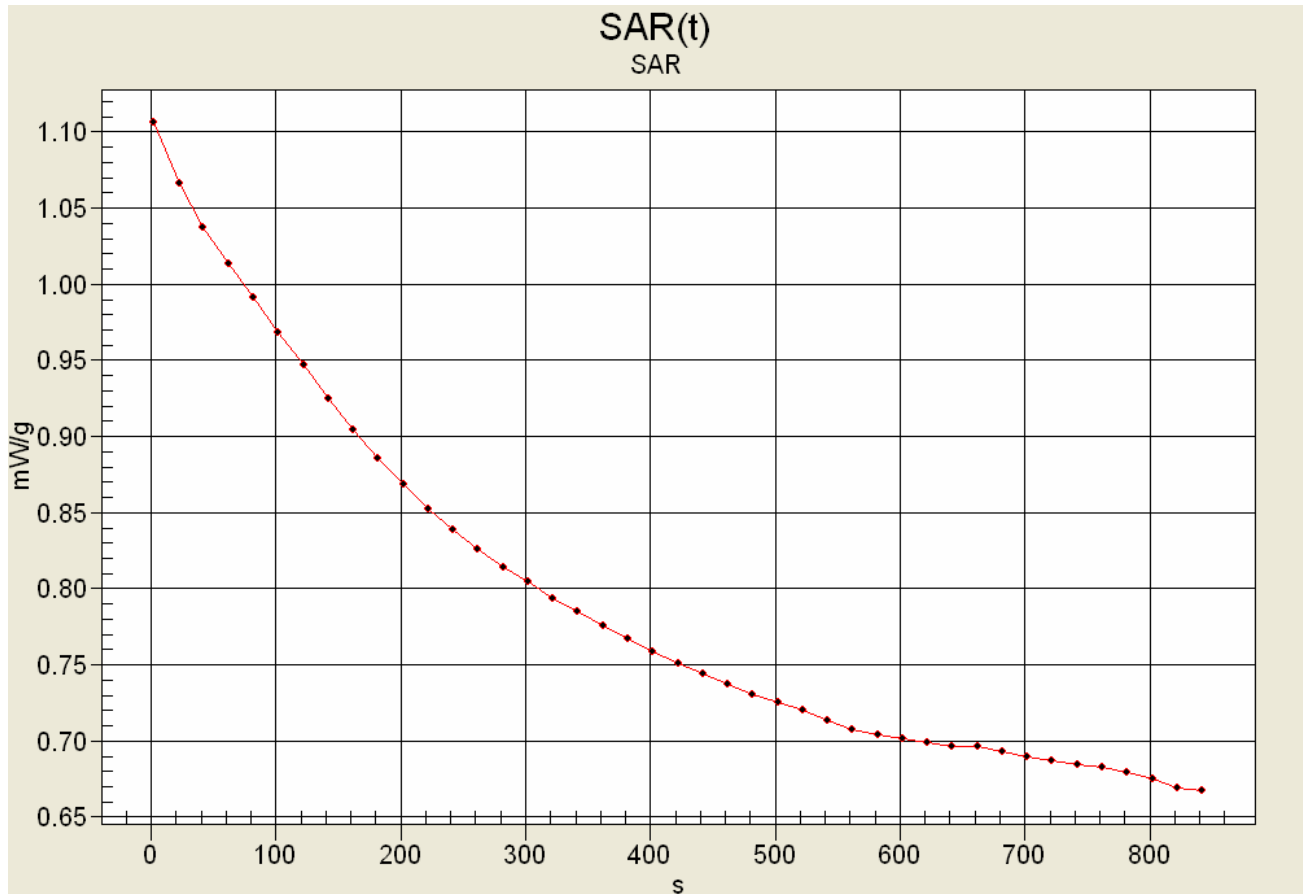
Applicant:	Uniden America Corporation	FCC ID:	AMWUT607	Model:	VHF150	
DUT Type:	Portable VHF PTT Marine Radio Transceiver	Freq. Range:	156.025 - 157.425 MHz			
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### Z-Axis Scan



### SAR-versus-Time Power Drift Evaluation

Face-Held Configuration  
 Li-ion Battery (P/N: BP250LI)  
 Mid Channel (16) - 156.800 MHz



**Max SAR: 1.10619 mW/g**  
**Low SAR: 0.667618 mW/g (-2.193 dB)**  
**SAR after 340s: 0.784878 mW/g (-1.490 dB)**  
 (340s = Zoom Scan Duration)  
 (840s = Area Scan Duration)

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Date Tested: 10/12/2005

## Body-Worn SAR

**DUT: Uniden Model: VHF150; Type: Portable VHF PTT Marine Radio Transceiver; Serial: None (Pre-Production)**

Ambient Temp: 23.5 °C; Fluid Temp: 22.6 °C; Barometric Pressure: 102.0 kPa; Humidity: 31%

Communication System: FM VHF  
 RF Output Power: 37.58 dBm (Conducted)  
 7.4V, 1400mAh Li-ion Battery Pack (P/N: BP250LI)  
 Frequency: 156.8 MHz; Channel 16; Duty Cycle: 1:1  
 Medium: M150 ( $\sigma = 0.77$  mho/m;  $\epsilon_r = 61.3$ ;  $\rho = 1000$  kg/m<sup>3</sup>)

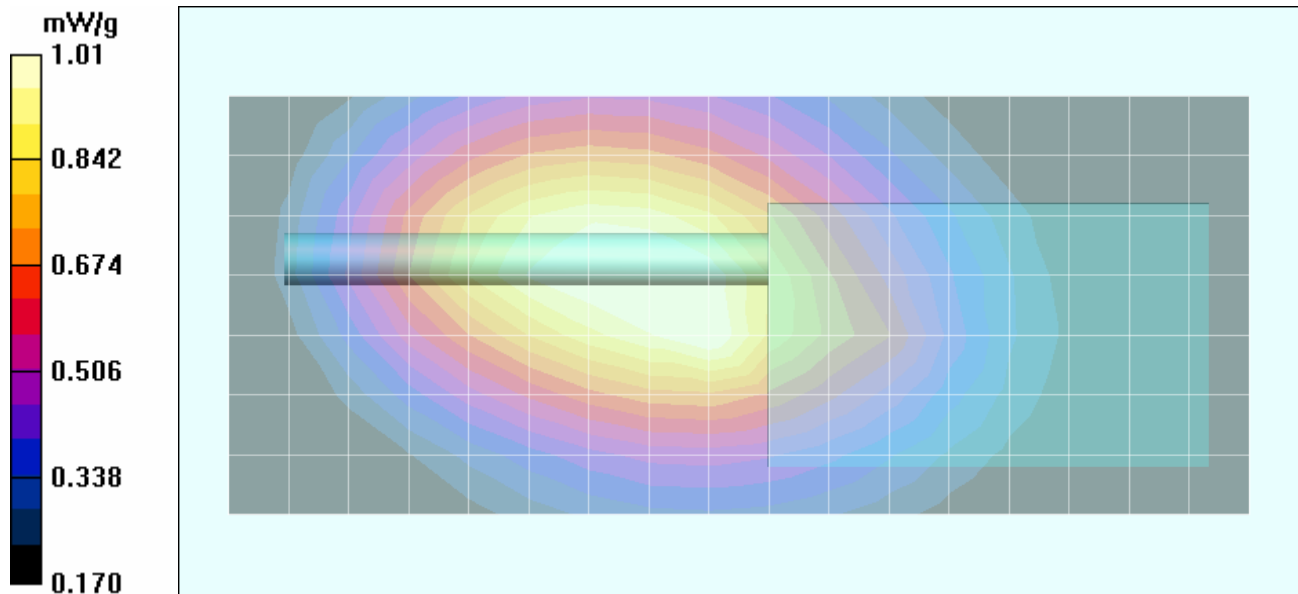
- Probe: ET3DV6 - SN1387; ConvF(8.4, 8.4, 8.4); Calibrated: 18/03/2005
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn353; Calibrated: 15/06/2005
- Phantom: Planar; Type: Plexiglas; Serial: 161
- Measurement SW: DASY4, V4.6 Build 19; Postprocessing SW: SEMCAD, V1.8 Build 159


**Body-Worn SAR - 2.2 cm Belt-Clip Separation Distance to Planar Phantom - Mid Channel/Area Scan (8x18x1):**

Measurement grid: dx=15mm, dy=15mm

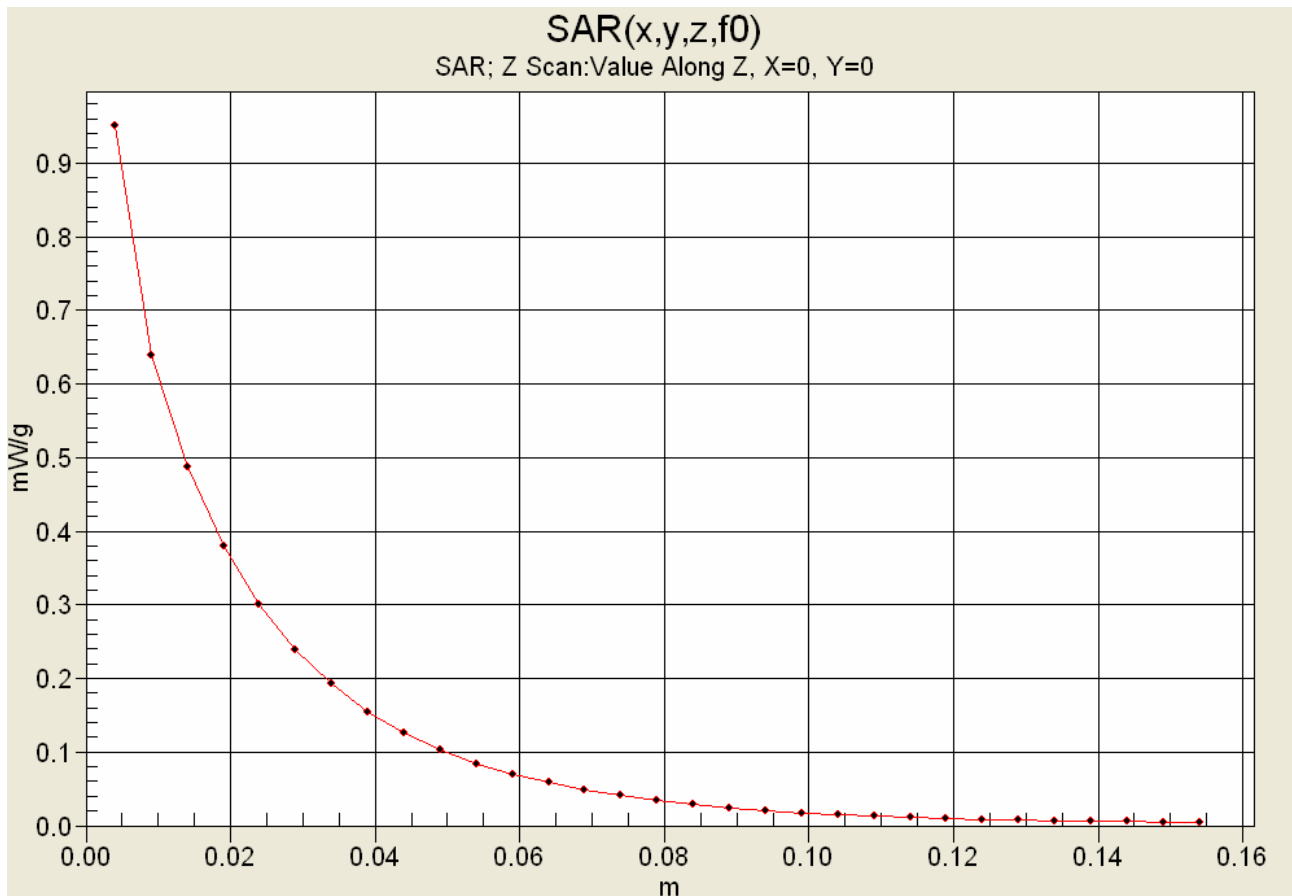
**Body-Worn SAR - 2.2 cm Belt-Clip Separation Distance to Planar Phantom - Mid Channel/Zoom Scan (5x5x7)/Cube 0:**

Measurement grid: dx=7.5mm, dy=7.5mm, dz=5mm  
 Reference Value = 33.0 V/m; Power Drift = -0.497 dB  
 Peak SAR (extrapolated) = 1.60 W/kg  
**SAR(1 g) = 0.959 mW/g; SAR(10 g) = 0.686 mW/g**




Applicant:	Uniden America Corporation	FCC ID:	AMWUT607	Model:	VHF150	
DUT Type:	Portable VHF PTT Marine Radio Transceiver	Freq. Range:	156.025 - 157.425 MHz			
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### Z-Axis Scan



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**APPENDIX B - SYSTEM PERFORMANCE CHECK DATA**

<b>Applicant:</b>	<b>Uniden America Corporation</b>	<b>FCC ID:</b>	<b>AMWUT607</b>	<b>Model:</b>	<b>VHF150</b>	
<b>DUT Type:</b>	<b>Portable VHF PTT Marine Radio Transceiver</b>	<b>Freq. Range:</b>	<b>156.025 - 157.425 MHz</b>			
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Date Tested: 10/11/2005

## System Performance Check - 300 MHz Dipole

**DUT: Dipole 300 MHz; Model: D300V2; Type: System Performance Check; Serial: 135; Calibrated: 10/26/2004**

Ambient Temp: 22.6 °C; Fluid Temp: 22.6 °C; Barometric Pressure: 102.3 kPa; Humidity: 32%

Communication System: CW

Forward Conducted Power: 250 mW

Frequency: 300 MHz; Duty Cycle: 1:1

Medium: 300 HSL ( $\sigma = 0.84$  mho/m;  $\epsilon_r = 44.5$ ;  $\rho = 1000$  kg/m<sup>3</sup>)

- Probe: ET3DV6 - SN1387; ConvF(7.9, 7.9, 7.9); Calibrated: 18/03/2005
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn353; Calibrated: 15/06/2005
- Phantom: Validation Planar; Type: Plexiglas; Serial: 137
- Measurement SW: DASY4, V4.6 Build 19; Postprocessing SW: SEMCAD, V1.8 Build 159

### 300 MHz Dipole - System Performance Check/Area Scan (6x11x1):

Measurement grid: dx=15mm, dy=15mm

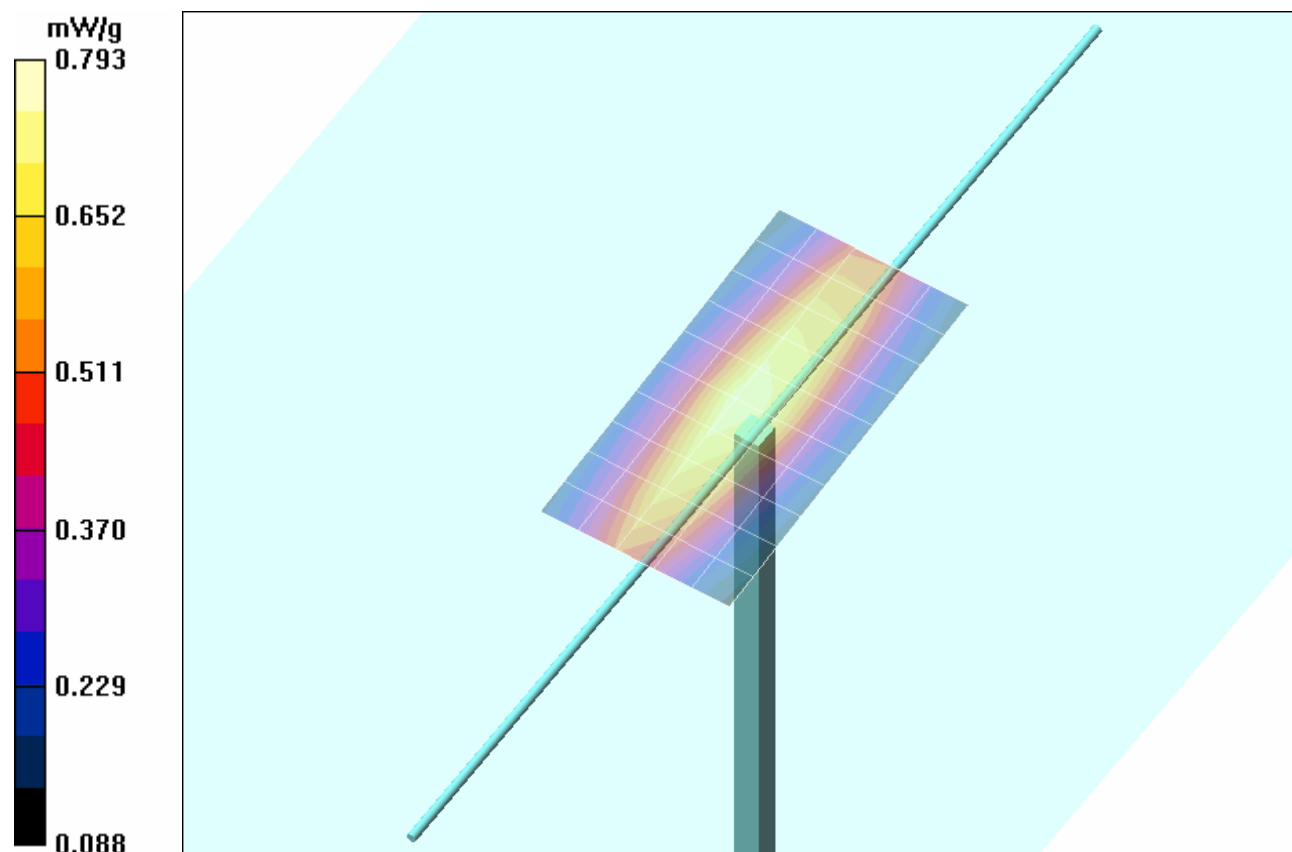
### 300 MHz Dipole - System Performance Check/Zoom Scan (7x7x7)/Cube 0:


Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 30.8 V/m; Power Drift = -0.042 dB

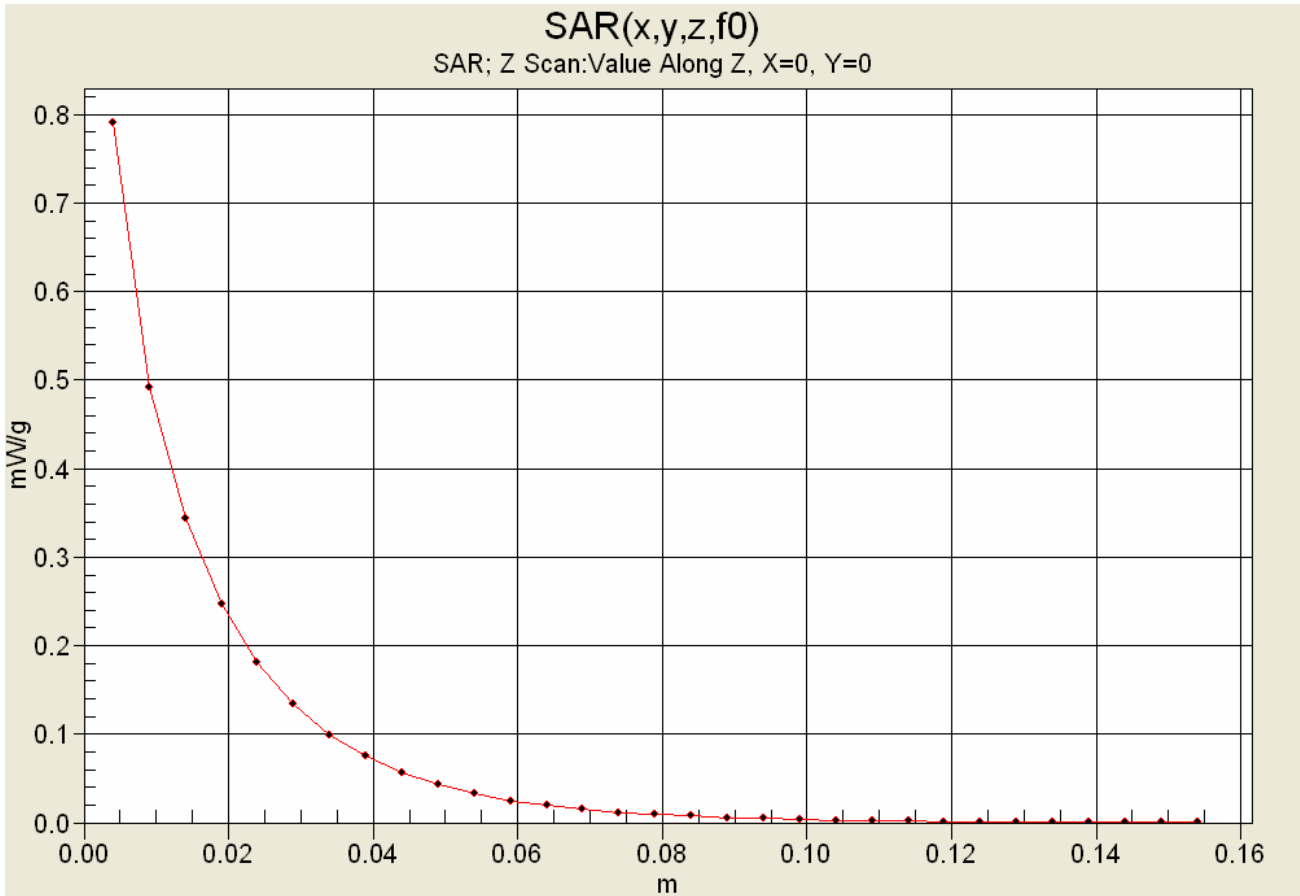
Peak SAR (extrapolated) = 1.33 W/kg

**SAR(1 g) = 0.756 mW/g; SAR(10 g) = 0.491 mW/g**



Applicant:	Uniden America Corporation	FCC ID:	AMWUT607	Model:	VHF150	
DUT Type:	Portable VHF PTT Marine Radio Transceiver	Freq. Range:	156.025 - 157.425 MHz			
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### Z-Axis Scan






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**APPENDIX C - MEASURED FLUID DIELECTRIC PARAMETERS**

<b>Applicant:</b>	<b>Uniden America Corporation</b>	<b>FCC ID:</b>	<b>AMWUT607</b>	<b>Model:</b>	<b>VHF150</b>	
<b>DUT Type:</b>	<b>Portable VHF PTT Marine Radio Transceiver</b>	<b>Freq. Range:</b>	<b>156.025 - 157.425 MHz</b>			
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	Description of Tests:	RF Exposure	SAR	FCC §2.1093

### 300 MHz System Performance Check (Brain)

\*\*\*\*\*

Celltech Labs Inc.

Test Result for UIM Dielectric Parameter

Tue 11/Oct/2005

Frequency(GHz)

FCC\_eH FCC OET 65 Supplement C (June 2001) Limits for Head Epsilon


FCC\_sH FCC OET 65 Supplement C (June 2001) Limits for Head Sigma

Test\_e Epsilon of UIM

Test\_s Sigma of UIM

\*\*\*\*\*

Freq	FCC_eH	FCC_sH	Test_e	Test_s
0.2000	49.97	0.80	48.02	0.7559
0.2100	49.50	0.80	47.71	0.7694
0.2200	49.03	0.81	47.44	0.7807
0.2300	48.57	0.82	47.48	0.7905
0.2400	48.10	0.83	46.62	0.7955
0.2500	47.63	0.83	46.40	0.8055
0.2600	47.17	0.84	45.73	0.8158
0.2700	46.70	0.85	44.91	0.8253
0.2800	46.23	0.86	45.20	0.8247
0.2900	45.77	0.86	44.46	0.8354
0.3000	45.30	0.87	44.45	0.8385
0.3100	45.18	0.87	43.87	0.8488
0.3200	45.06	0.87	43.53	0.8572
0.3300	44.94	0.87	43.30	0.8679
0.3400	44.82	0.87	42.95	0.8744
0.3500	44.70	0.87	42.77	0.8788
0.3600	44.58	0.87	42.34	0.8921
0.3700	44.46	0.87	42.12	0.9115
0.3800	44.34	0.87	42.03	0.9125
0.3900	44.22	0.87	41.55	0.9200
0.4000	44.10	0.87	41.09	0.9233

Applicant:	Uniden America Corporation	FCC ID:	AMWUT607	Model:	VHF150	
DUT Type:	Portable VHF PTT Marine Radio Transceiver	Freq. Range:	156.025 - 157.425 MHz			
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	Test Report Serial No.:	100605AMW-F681-S80V	Report Issue Date:	Oct. 14, 2005
	Date(s) of Evaluation:	October 11-12, 2005	Report Rev. No.:	Revision 0
	Description of Tests:	RF Exposure	SAR	FCC §2.1093

**150 MHz DUT Evaluation (Face)**

\*\*\*\*\*

Celltech Labs Inc.

Test Result for UIM Dielectric Parameter

Tue 11/Oct/2005

Frequency(GHz)

FCC\_eH FCC OET 65 Supplement C (June 2001) Limits for Head Epsilon


FCC\_sH FCC OET 65 Supplement C (June 2001) Limits for Head Sigma


Test\_e Epsilon of UIM

Test\_s Sigma of UIM

\*\*\*\*\*

Freq	FCC_eH	FCC_sH	Test_e	Test_s
0.0500	56.97	0.69	58.01	0.6702
0.0600	56.50	0.69	59.80	0.6791
0.0700	56.03	0.70	61.02	0.6906
0.0800	55.57	0.71	62.52	0.6925
0.0900	55.10	0.72	59.16	0.7038
0.1000	54.63	0.72	59.37	0.7191
0.1100	54.17	0.73	54.85	0.7290
0.1200	53.70	0.74	55.65	0.7372
0.1300	53.23	0.75	54.40	0.7449
0.1400	52.77	0.75	55.69	0.7483
<b>0.1500</b>	<b>52.30</b>	<b>0.76</b>	<b>53.09</b>	<b>0.7660</b>
0.1600	51.83	0.77	52.75	0.7651
0.1700	51.37	0.77	52.70	0.7810
0.1800	50.90	0.78	52.40	0.7895
0.1900	50.43	0.79	52.48	0.7990
0.2000	49.97	0.80	51.11	0.8152
0.2100	49.50	0.80	50.81	0.8176
0.2200	49.03	0.81	49.85	0.8256
0.2300	48.57	0.82	49.79	0.8380
0.2400	48.10	0.83	49.58	0.8433
0.2500	47.63	0.83	48.99	0.8518

Applicant:	Uniden America Corporation	FCC ID:	AMWUT607	Model:	VHF150	
DUT Type:	Portable VHF PTT Marine Radio Transceiver	Freq. Range:	156.025 - 157.425 MHz			
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	Test Report Serial No.:	100605AMW-F681-S80V	Report Issue Date:	Oct. 14, 2005
	Date(s) of Evaluation:	October 11-12, 2005	Report Rev. No.:	Revision 0
	Description of Tests:	RF Exposure	SAR	FCC §2.1093


**150 MHz DUT Evaluation (Body)**

\*\*\*\*\*

Celltech Labs Inc.  
 Test Result for UIM Dielectric Parameter  
 Wed 12/Oct/2005  
 Frequency(GHz)  
 FCC\_eH FCC Bulletin 65 Supplement C ( June 2001) Limits for Head Epsilon  
 FCC\_sH FCC Bulletin 65 Supplement C (June 2001) Limits for Head Sigma  
 FCC\_eB FCC Limits for Body Epsilon  
 FCC\_sB FCC Limits for Body Sigma  
 Test\_e Epsilon of UIM  
 Test\_s Sigma of UIM


\*\*\*\*\*

Freq	FCC_eB	FCC_sB	Test_e	Test_s
0.0500	64.37	0.72	71.41	0.7135
0.0600	64.12	0.73	68.83	0.7224
0.0700	63.87	0.74	64.70	0.7192
0.0800	63.63	0.74	62.41	0.7232
0.0900	63.38	0.75	63.92	0.7244
0.1000	63.13	0.76	62.65	0.7271
0.1100	62.89	0.77	61.22	0.7489
0.1200	62.64	0.78	61.52	0.7426
0.1300	62.39	0.78	61.66	0.7569
0.1400	62.15	0.79	62.76	0.7706
<b>0.1500</b>	<b>61.90</b>	<b>0.80</b>	<b>61.26</b>	<b>0.7684</b>
0.1600	61.65	0.81	60.95	0.7819
0.1700	61.41	0.82	61.07	0.7854
0.1800	61.16	0.82	60.27	0.7822
0.1900	60.91	0.83	59.59	0.7983
0.2000	60.67	0.84	59.51	0.8022
0.2100	60.42	0.85	58.71	0.8104
0.2200	60.17	0.86	58.32	0.8289
0.2300	59.93	0.86	58.45	0.8369
0.2400	59.68	0.87	58.13	0.8366
0.2500	59.43	0.88	57.71	0.8449

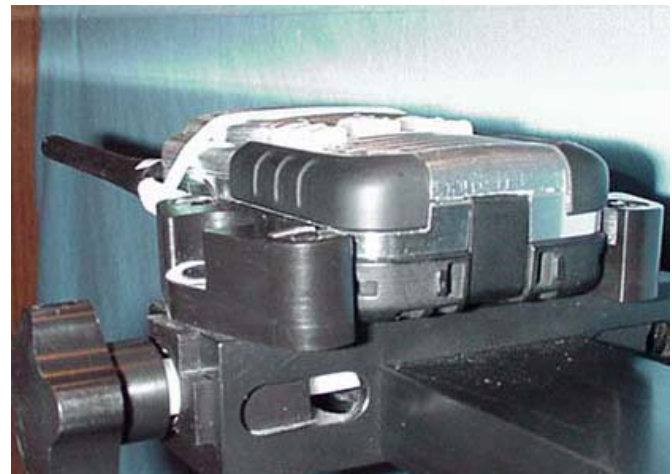
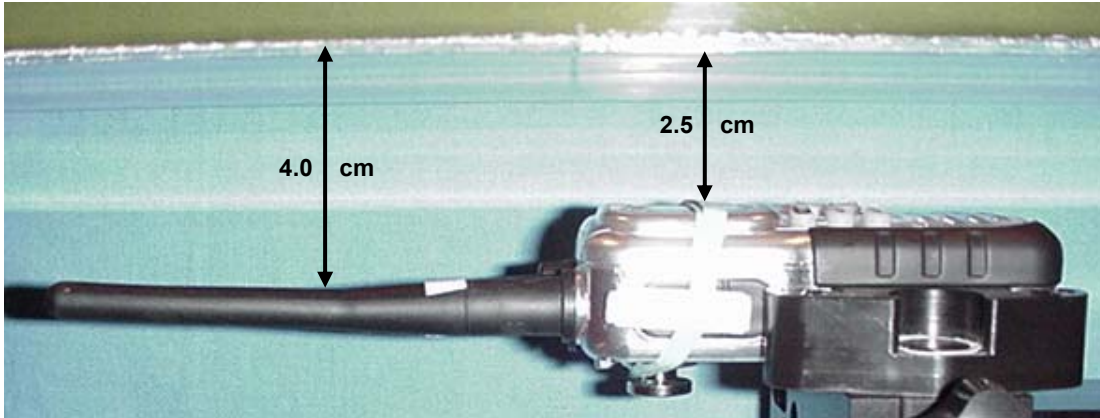
<b>Applicant:</b>	<b>Uniden America Corporation</b>	<b>FCC ID:</b>	<b>AMWUT607</b>	<b>Model:</b>	<b>VHF150</b>	
<b>DUT Type:</b>	<b>Portable VHF PTT Marine Radio Transceiver</b>	<b>Freq. Range:</b>	<b>156.025 - 157.425 MHz</b>			
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	Test Report Serial No.:	100605AMW-F681-S80V	Report Issue Date:	Oct. 14, 2005
	Date(s) of Evaluation:	October 11-12, 2005	Report Rev. No.:	Revision 0
	Description of Tests:	RF Exposure      SAR	FCC §2.1093	IC RSS-102

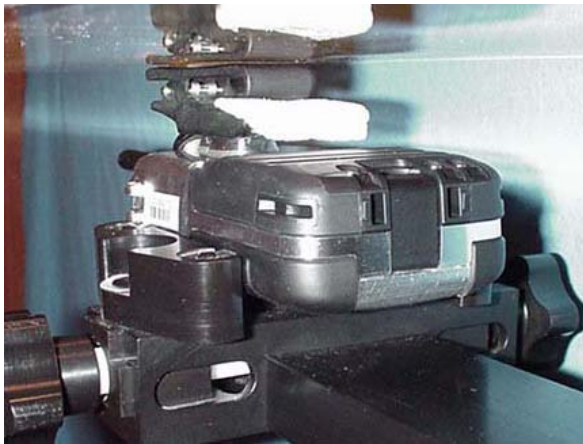
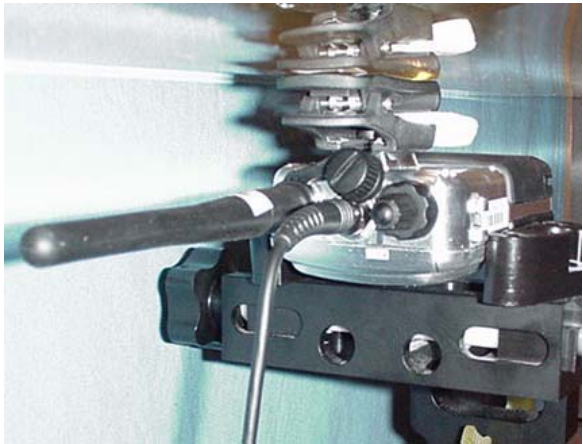
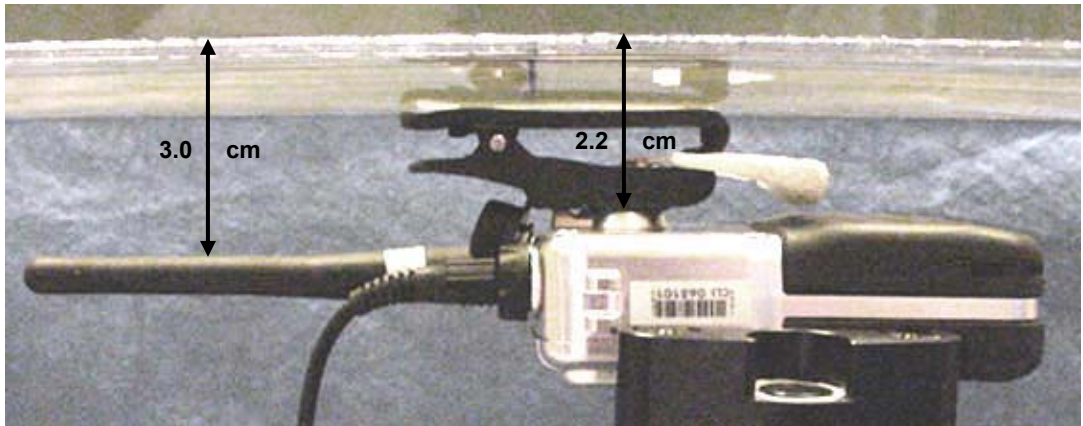
**APPENDIX D - SAR TEST SETUP & DUT PHOTOGRAPHS**

<b>Applicant:</b>	<b>Uniden America Corporation</b>	<b>FCC ID:</b>	<b>AMWUT607</b>	<b>Model:</b>	<b>VHF150</b>	
<b>DUT Type:</b>	<b>Portable VHF PTT Marine Radio Transceiver</b>	<b>Freq. Range:</b>	<b>156.025 - 157.425 MHz</b>			
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**FACE-HELD SAR TEST SETUP PHOTOGRAPHS**  
2.5 cm Separation Distance from Front of Radio to Planar Phantom



**BODY-WORN SAR TEST SETUP PHOTOGRAPHS**  
**2.2 cm Belt-Clip Separation Distance to Planar Phantom**  
**With Speaker-Microphone Audio Accessory**



## SAR TEST SETUP PHOTOGRAPHS



**Face-Held Test Setup Configuration**



**Body-Worn Test Setup Configuration**



## DUT PHOTOGRAPHS



Front of DUT



Back of DUT



Back of DUT with Belt-Clip

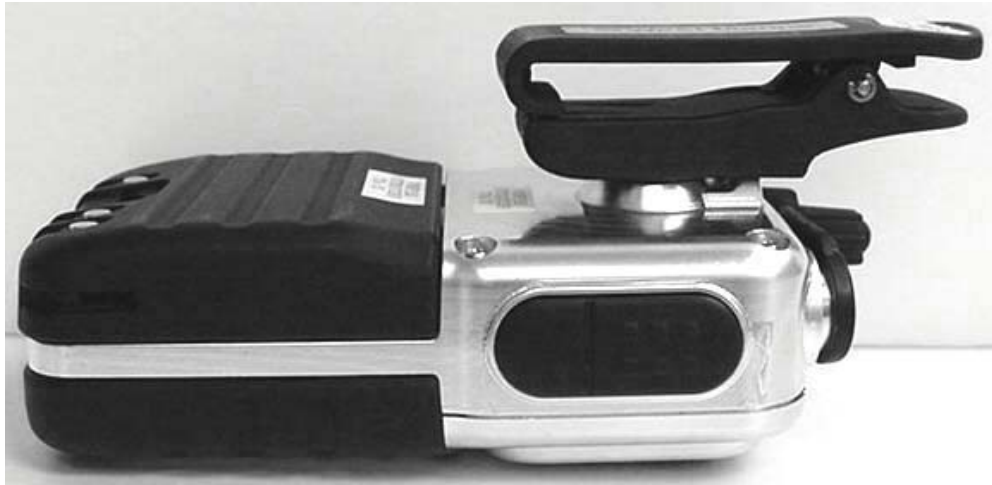


Top end of DUT



Bottom end of DUT

## DUT PHOTOGRAPHS



Left Side of DUT with Swivel Belt-Clip



Right Side of DUT with Swivel Belt-Clip



Swivel Belt-Clip accessory (Plastic with metal spring)  
(P/N: CLIP250)

	Test Report Serial No.:	100605AMW-F681-S80V	Report Issue Date:	Oct. 14, 2005
	Date(s) of Evaluation:	October 11-12, 2005	Report Rev. No.:	Revision 0
	Description of Tests:	RF Exposure	SAR	FCC §2.1093

**DUT PHOTOGRAPHS**




**DUT Battery Compartment**



**Li-ion Battery Pack**



**Flexible Whip Antenna (P/N: ANT150)**

<b>Applicant:</b>	Uniden America Corporation	<b>FCC ID:</b>	AMWUT607	<b>Model:</b>	VHF150	
<b>DUT Type:</b>	Portable VHF PTT Marine Radio Transceiver	<b>Freq. Range:</b>	156.025 - 157.425 MHz			
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**DUT PHOTOGRAPHS**



**DUT with Speaker-Microphone Audio Accessory (Model: HHVTA07)**

	Test Report Serial No.:	100605AMW-F681-S80V	Report Issue Date:	Oct. 14, 2005
	Date(s) of Evaluation:	October 11-12, 2005	Report Rev. No.:	Revision 0
	Description of Tests:	RF Exposure      SAR	FCC §2.1093	IC RSS-102

**APPENDIX E - SYSTEM VALIDATION**

<b>Applicant:</b>	<b>Uniden America Corporation</b>	<b>FCC ID:</b>	<b>AMWUT607</b>	<b>Model:</b>	<b>VHF150</b>	
<b>DUT Type:</b>	<b>Portable VHF PTT Marine Radio Transceiver</b>	<b>Freq. Range:</b>	<b>156.025 - 157.425 MHz</b>			
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## 300 MHz SYSTEM VALIDATION DIPOLE

Type:

**300 MHz Validation Dipole**

Serial Number:

**135**

Place of Calibration:

**Celltech Labs Inc.**

Date of Calibration:

**October 26, 2004**

Celltech Labs Inc. hereby certifies that this device has been calibrated on the date indicated above.

Calibrated by:

*Spencer Watson*

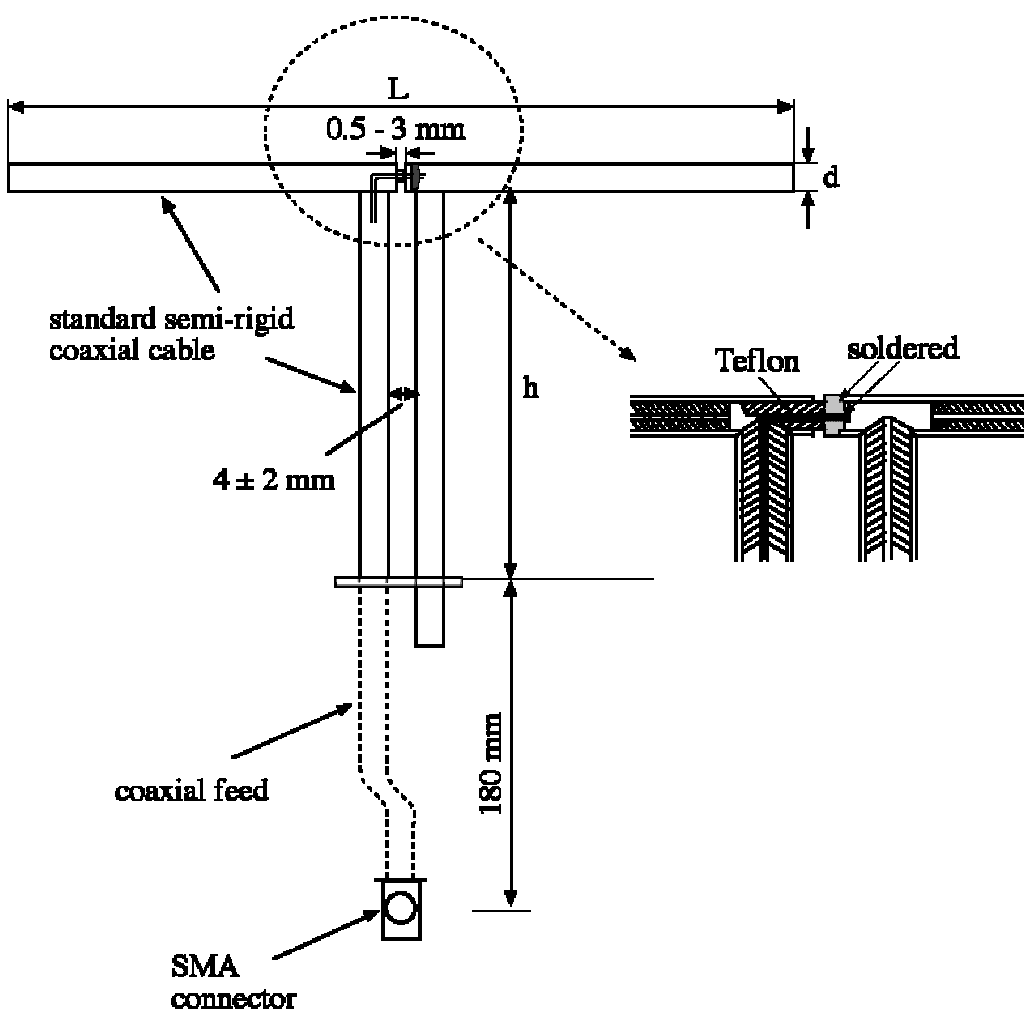
Approved by:

*Russell W. Pipe*

## 1. Validation Dipole Construction & Electrical Characteristics

The validation dipole was constructed in accordance with the IEEE Std. "Recommended Practice for Determining the Spatial-Peak Specific Absorption Rate (SAR) in the Human Body Due to Wireless Communications Devices: Experimental Techniques". The electrical properties were measured using an HP 8753E Network Analyzer. The network analyzer was calibrated to the validation dipole N-type connector feed point using an HP85032E Type N calibration kit. The dipole was placed parallel to a planar phantom at a separation distance of 15.0mm from the simulating fluid using a loss-less dielectric spacer. The measured input impedance is:

Feed point impedance at 300MHz	$\text{Re}\{Z\} = 45.156\Omega$
	$\text{Im}\{Z\} = -2.1934\Omega$
Return Loss at 300MHz	-25.060dB



MEM 1 U FS

26 Oct 2004 10:03:55

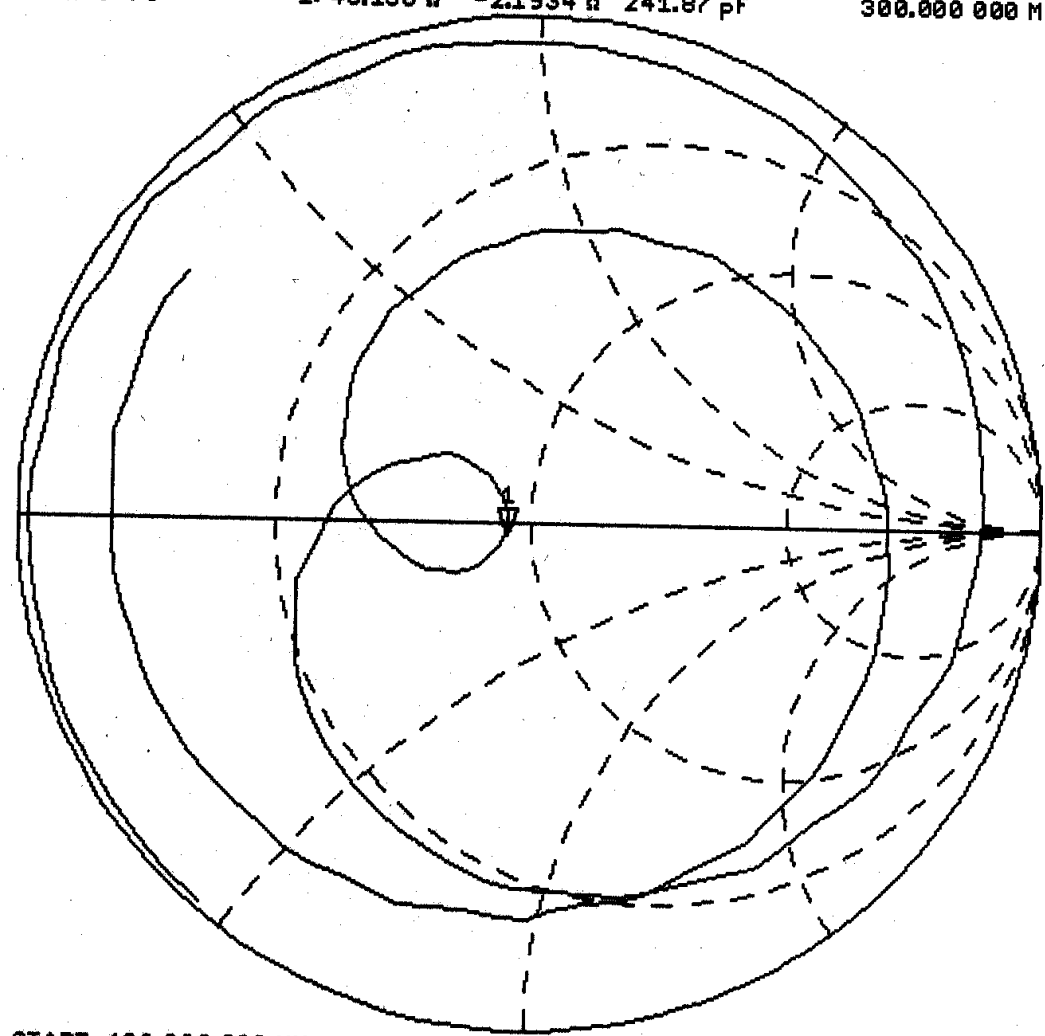
1145.156 n -2.1934 n 241.87 pF

300.000 000 MHz

PRm

Cor

↑



START 100.000 000 MHz

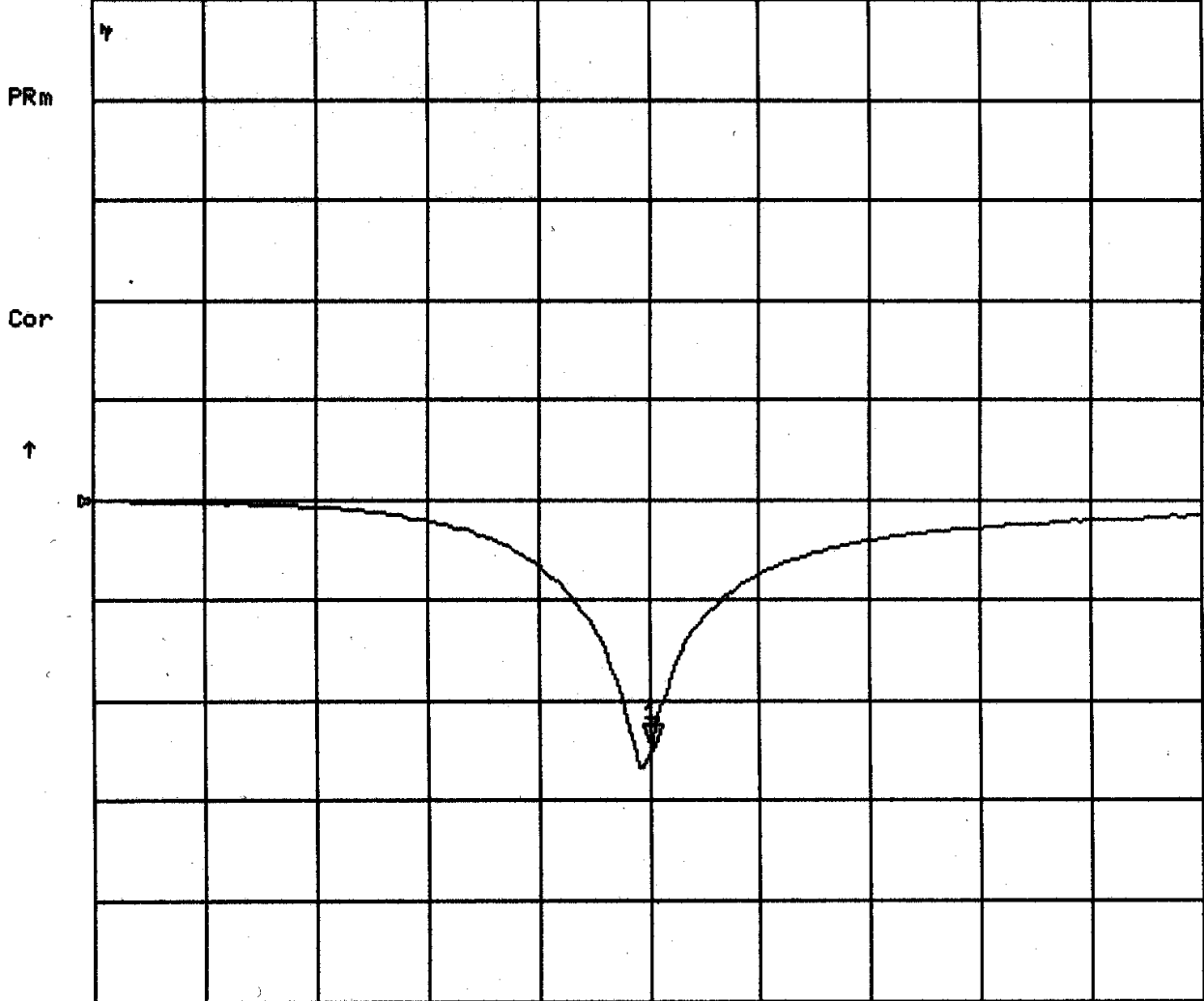
STOP 500.000 000 MHz



26 Oct 2004 10:02:53

CH1 MEM LOG 10 dB/REF 0 dB

1:-25.060 dB 300.000 000 MHz



START 100.000 000 MHz

STOP 500.000 000 MHz

## 2. Validation Dipole Dimensions

Frequency (MHz)	L (mm)	H (mm)	D (mm)
300	420.0	250.0	6.2
450	288.0	167.0	6.2
835	161.0	89.8	3.6
900	149.0	83.3	3.6
1450	89.1	51.7	3.6
1800	72.0	41.7	3.6
1900	68.0	39.5	3.6
2000	64.5	37.5	3.6
2450	51.8	30.6	3.6
3000	41.5	25.0	3.6

## 3. Validation Phantom

The validation phantom was constructed using relatively low-loss tangent Plexiglas material. The inner dimensions of the phantom are as follows:

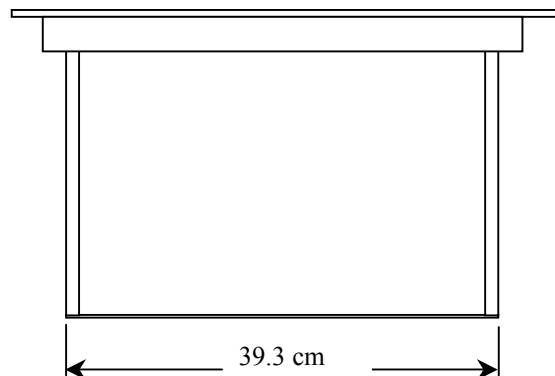
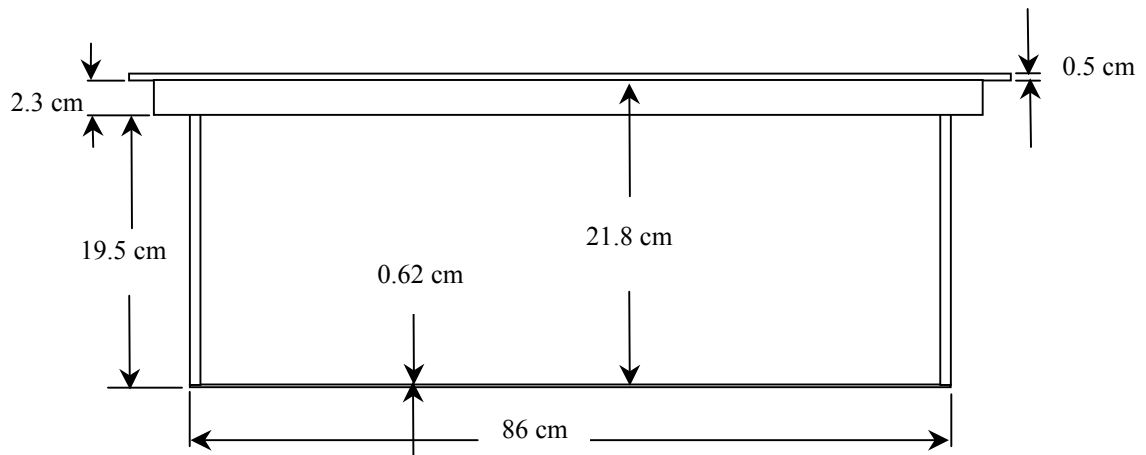
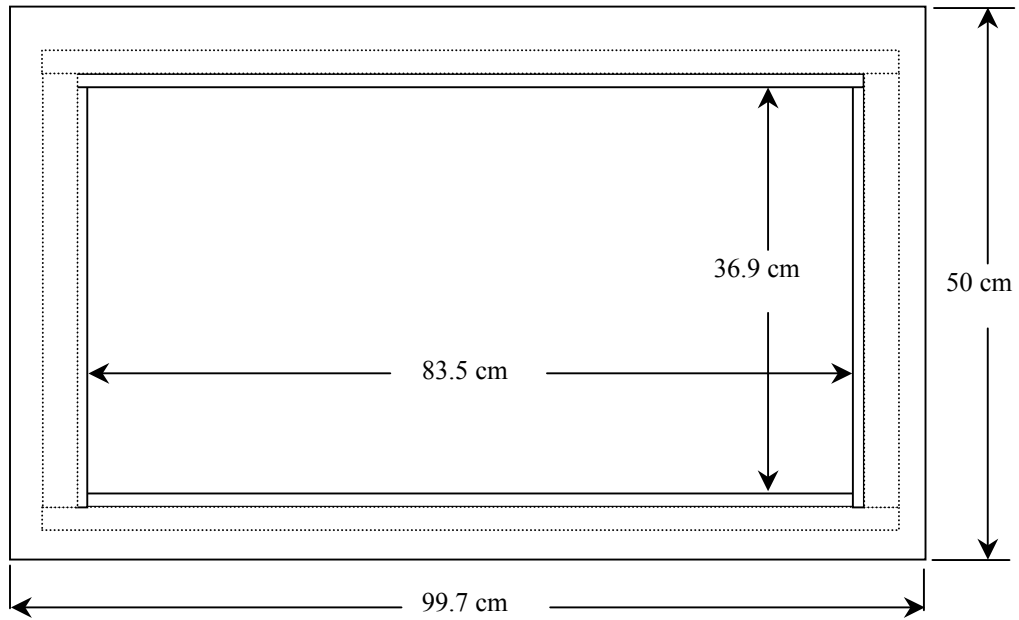
Length: 83.5 cm

Width: 36.9 cm

Height: 21.8 cm

The bottom section of the validation phantom is constructed of  $6.2 \pm 0.1$ mm Plexiglas.

#### 4. Dimensions of Plexiglas Planar Phantom



**5. 300 MHz System Validation Setup**



**300 MHz Validation Dipole Setup**



## 6. Measurement Conditions

The planar phantom was filled with simulated brain tissue having the following parameters at 300 MHz:

Relative Permittivity:	45.9
Conductivity:	0.87 mho/m
Fluid Temperature:	22.8 °C
Fluid Depth:	≥ 15 cm

Environmental Conditions:

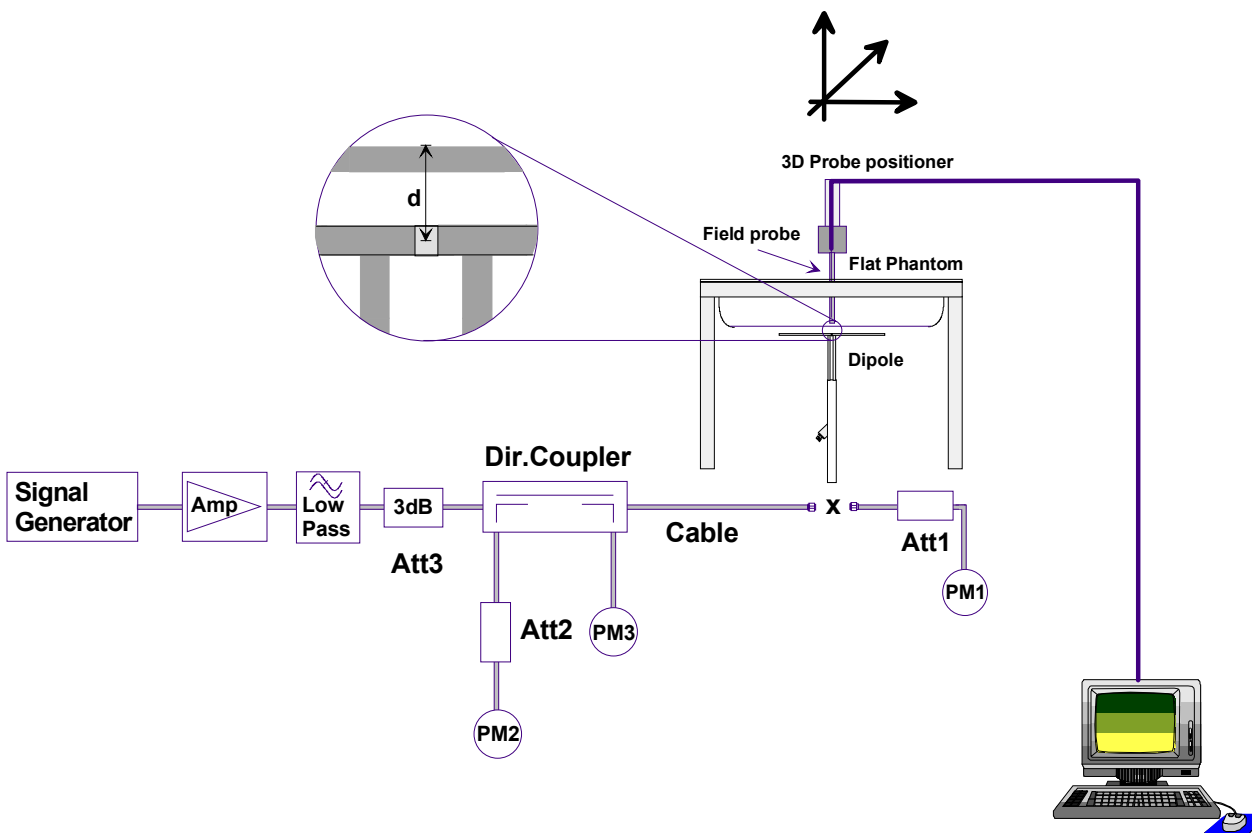
Ambient Temperature:	23.7 °C
Humidity:	33 %
Barometric Pressure:	101.9 kPa

The 300 MHz simulated brain tissue mixture consists of the following ingredients:

<b>Ingredient</b>	<b>Percentage by weight</b>
Water	37.56%
Sugar	55.32%
Salt	5.95%
HEC	0.98%
Dowicil 75	0.19%
300 MHz Target Dielectric Parameters at 22°C	$\epsilon_r = 45.3$ $\sigma = 0.87 \text{ S/m}$

## 7. SAR Measurement

The SAR measurement was performed with the E-field probe in mechanical detection mode only. The setup and determination of the forward power into the dipole was performed using the following procedures.



First the power meter PM1 (including attenuator Att1) is connected to the cable to measure the forward power at the location of the dipole connector (X). The signal generator is adjusted for the desired forward power at the dipole connector (taking into account the attenuation of Att1) as read by power meter PM2. After connecting the cable to the dipole, the signal generator is readjusted for the same reading at power meter PM2. If the signal generator does not allow adjustment in 0.01dB steps, the remaining difference at PM2 must be taken into consideration. PM3 records the reflected power from the dipole to ensure that the value is not changed from the previous value. The reflected power should be 20dB below the forward power.

## 8. Validation Dipole SAR Test Results

Ten SAR measurements were performed in order to achieve repeatability and to establish an average target value.

Validation Measurement	SAR @ 0.25W Input averaged over 1g	SAR @ 1W Input averaged over 1g	SAR @ 0.25W Input averaged over 10g	SAR @ 1W Input averaged over 10g	Peak SAR @ 0.25W Input
Test 1	0.740	2.96	0.478	1.91	0.779
Test 2	0.736	2.94	0.475	1.90	0.773
Test 3	0.747	2.99	0.482	1.93	0.790
Test 4	0.735	2.94	0.476	1.90	0.776
Test 5	0.743	2.97	0.480	1.92	0.781
Test 6	0.741	2.96	0.479	1.92	0.782
Test 7	0.742	2.97	0.480	1.92	0.780
Test 8	0.740	2.96	0.478	1.91	0.777
Test 9	0.748	2.99	0.484	1.94	0.787
Test 10	0.744	2.98	0.481	1.92	0.781
Average Value	0.742	2.97	0.479	1.92	0.781

The results have been normalized to 1W (forward power) into the dipole.

IEEE Target over  $1\text{cm}^3$  (1g) of tissue: 3.0 mW/g (+/- 10%)

**Averaged over  $1\text{cm}^3$  (1g) of tissue: 2.97 mW/g (-3% deviation)**

IEEE Target over  $10\text{cm}^3$  (10g) of tissue: 2.0 mW/g (+/- 10%)

**Averaged over  $10\text{cm}^3$  (10g) of tissue: 1.92 mW/g (-4% deviation)**



## 300 MHz System Validation - October 26, 2004

**DUT: Dipole 300 MHz; Model: D300V2; Serial: 135; Calibrated: 10/26/04**

Ambient Temp: 23.7 °C; Fluid Temp: 22.8 °C; Barometric Pressure: 101.9 kPa; Humidity: 33%

Communication System: CW

Frequency: 300 MHz; Duty Cycle: 1:1

Medium: 300 HSL ( $\sigma = 0.87$  mho/m;  $\epsilon_r = 45.9$ ;  $\rho = 1000$  kg/m<sup>3</sup>)

- Probe: ET3DV6 - SN1387; ConvF(7.8, 7.8, 7.8); Calibrated: 18/03/2004

- Sensor-Surface: 4mm (Mechanical Surface Detection)

- Electronics: DAE3 Sn370; Calibrated: 14/05/2004

- Phantom: Validation Planar; Type: Plexiglas; Serial: 137

- Measurement SW: DASY4, V4.3 Build 22; Postprocessing SW: SEMCAD, V1.8 Build 127

**300 MHz System Validation/Area Scan (6x11x1):** Measurement grid: dx=15mm, dy=15mm

**300 MHz System Validation/Zoom Scan (7x7x7)/Cube 0:** Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 30 V/m; Power Drift = -0.0 dB

Peak SAR (extrapolated) = 1.32 W/kg

**SAR(1 g) = 0.740 mW/g; SAR(10 g) = 0.478 mW/g**

**300 MHz System Validation/Zoom Scan 2 (7x7x7)/Cube 0:** Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 29.8 V/m; Power Drift = -0.0 dB

Peak SAR (extrapolated) = 1.32 W/kg

**SAR(1 g) = 0.736 mW/g; SAR(10 g) = 0.475 mW/g**

**300 MHz System Validation/Zoom Scan 3 (7x7x7)/Cube 0:** Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 30 V/m; Power Drift = 0.0 dB

Peak SAR (extrapolated) = 1.34 W/kg

**SAR(1 g) = 0.747 mW/g; SAR(10 g) = 0.482 mW/g**

**300 MHz System Validation/Zoom Scan 4 (7x7x7)/Cube 0:** Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 29.8 V/m; Power Drift = 0.005 dB

Peak SAR (extrapolated) = 1.31 W/kg

**SAR(1 g) = 0.735 mW/g; SAR(10 g) = 0.476 mW/g**

**300 MHz System Validation/Zoom Scan 5 (7x7x7)/Cube 0:** Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 30 V/m; Power Drift = -0.0 dB

Peak SAR (extrapolated) = 1.33 W/kg

**SAR(1 g) = 0.743 mW/g; SAR(10 g) = 0.480 mW/g**

**300 MHz System Validation/Zoom Scan 6 (7x7x7)/Cube 0:** Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 30 V/m; Power Drift = -0.0 dB

Peak SAR (extrapolated) = 1.33 W/kg

**SAR(1 g) = 0.741 mW/g; SAR(10 g) = 0.479 mW/g**

**300 MHz System Validation/Zoom Scan 7 (7x7x7)/Cube 0:** Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 30 V/m; Power Drift = 0.0 dB

Peak SAR (extrapolated) = 1.32 W/kg

**SAR(1 g) = 0.742 mW/g; SAR(10 g) = 0.480 mW/g**

**300 MHz System Validation/Zoom Scan 8 (7x7x7)/Cube 0:** Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 29.9 V/m; Power Drift = 4e-005 dB

Peak SAR (extrapolated) = 1.32 W/kg

**SAR(1 g) = 0.740 mW/g; SAR(10 g) = 0.478 mW/g**

**300 MHz System Validation/Zoom Scan 9 (7x7x7)/Cube 0:** Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 30 V/m; Power Drift = 0.0 dB

Peak SAR (extrapolated) = 1.34 W/kg

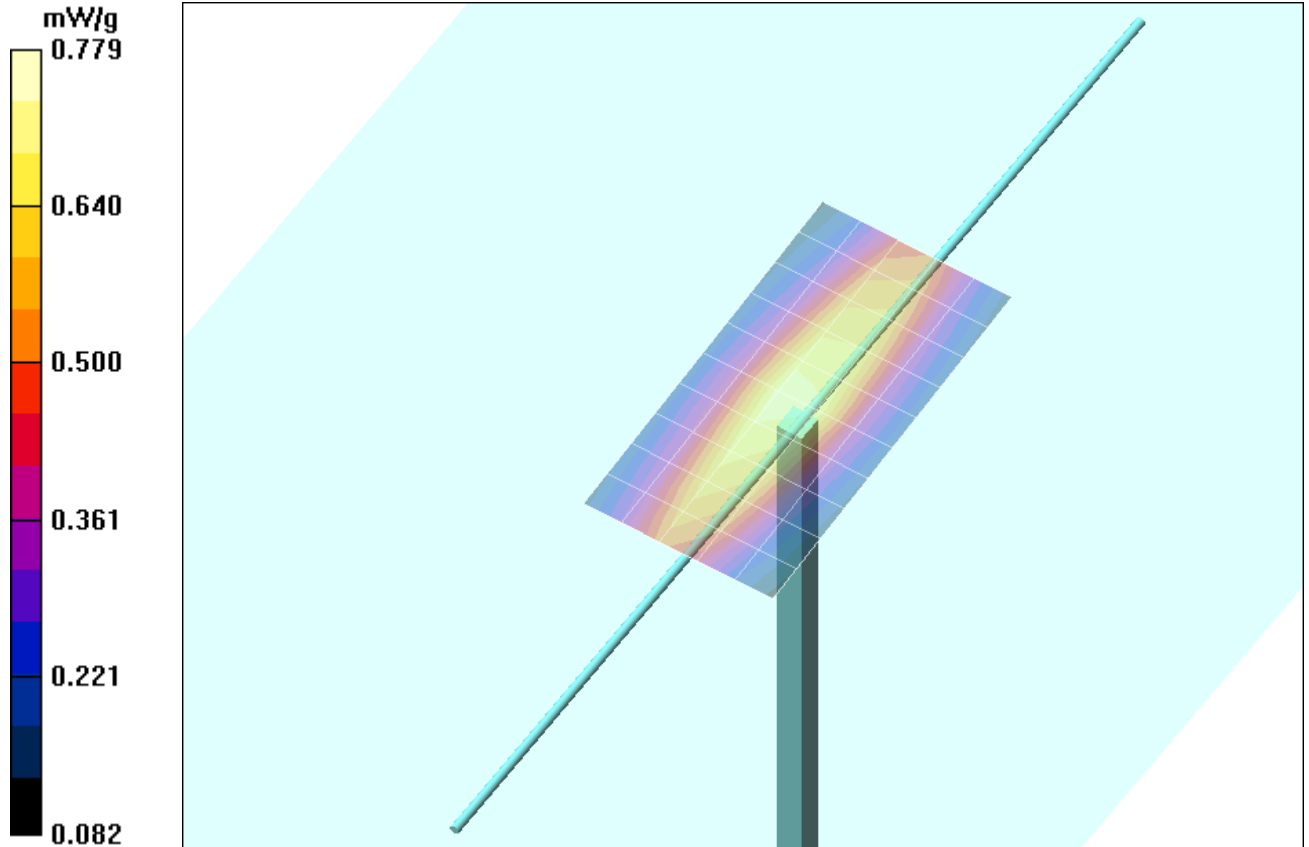
**SAR(1 g) = 0.748 mW/g; SAR(10 g) = 0.484 mW/g**

**300 MHz Validation/Zoom Scan 10 (7x7x7)/Cube 0:** Measurement grid: dx=5mm, dy=5mm, dz=5mm

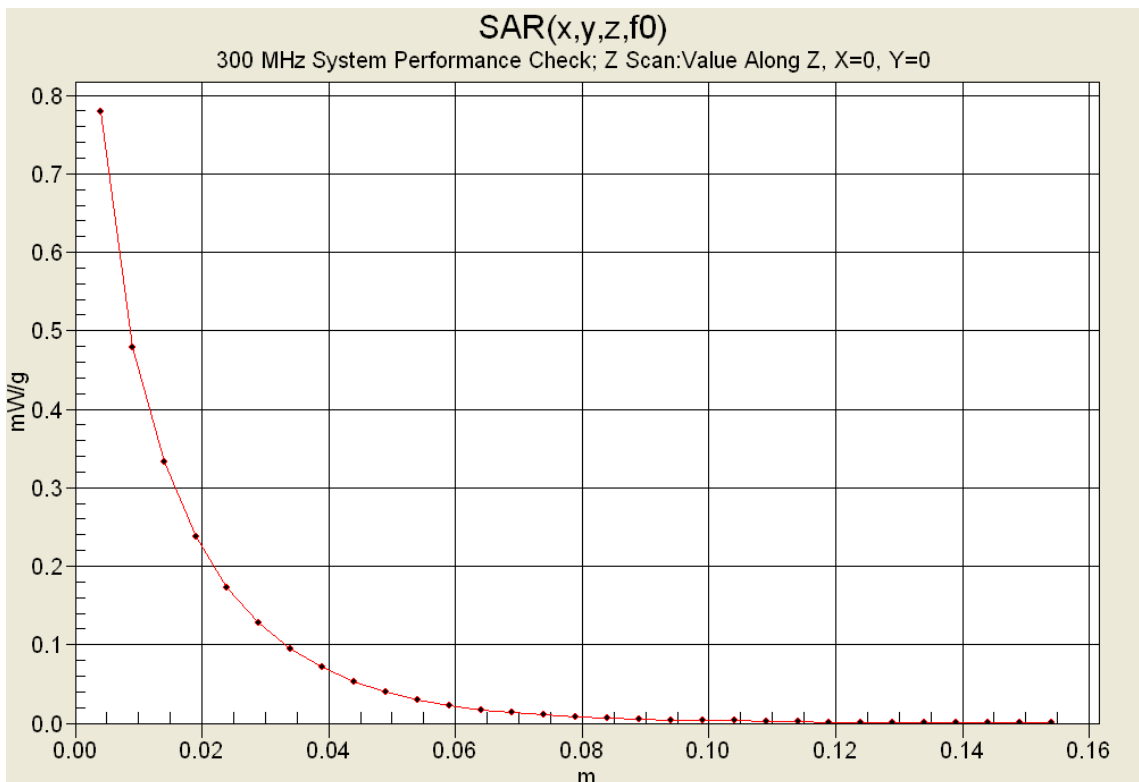
Reference Value = 29.9 V/m; Power Drift = 0.005 dB

Peak SAR (extrapolated) = 1.33 W/kg

**SAR(1 g) = 0.744 mW/g; SAR(10 g) = 0.481 mW/g**



**1 g average of 10 measurements: 0.742 mW/g**  
**10 g average of 10 measurements: 0.479 mW/g**



# 300 MHz System Validation

## Measured Fluid Dielectric Parameters (Brain)

October 26, 2004

Frequency	$\epsilon'$	$\epsilon''$
200.000000 MHz	49.9683	70.5699
210.000000 MHz	49.2757	67.8974
220.000000 MHz	49.0561	65.5986
230.000000 MHz	48.5199	63.5063
240.000000 MHz	47.9983	61.3980
250.000000 MHz	47.6116	59.5294
260.000000 MHz	47.1692	57.8735
270.000000 MHz	46.7769	56.3204
280.000000 MHz	46.4409	54.8280
290.000000 MHz	46.0613	53.4572
300.000000 MHz	45.8972	52.0989
310.000000 MHz	45.6039	51.0027
320.000000 MHz	45.2697	49.7697
330.000000 MHz	44.7890	48.6923
340.000000 MHz	44.3811	47.7213
350.000000 MHz	44.0222	46.8979
360.000000 MHz	43.6368	46.0075
370.000000 MHz	43.3432	45.1665
380.000000 MHz	43.1554	44.4459
390.000000 MHz	42.9327	43.7340
400.000000 MHz	42.6580	43.0434